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Journal of the Society of Arts.

FRIDAY, MARCH 25, 1859.

◆

EXHIBITION OF 1861.

The following letter has been received from Sir Wm. Holmes:—

Sir,—Having been favoured with your circulars of 30th December, 1858, I venture to suggest that it would add much to the interest of the collections to be forwarded from the colonies, if the Fauna and Flora of the respective countries were added to the more utilitarian ingredients.

We will suppose the department to be allotted to British Guiana approachable through a grove of palms of various descriptions, and other characteristic plants, Some of our more remarkable animals, our many-tinted birds, butterflies, and insects, should be represented as naturally as circumstances would admit in this tropical grove. There, too, would appear orchids, ferns, sensitive plants, the pine-apple, sugar-cane—in fact, every procurable plant, indigenous to the locality represented, which would best and most peculiarly illustrate the place of its nativity.

Were it possible—and in these days all things are possible—the climate of the country should be in some degree represented, not only for better illustration, but for the sake of the plants, and, perhaps, of the visitors.

In foreign cities I have seen cathedrals complete in themselves, yet with numerous chapels attached, each, also, complete in itself. Some such plan, I imagine, might be adopted for the building of 1861. The United Kingdom, occupying a vast centre transept, with its colonies in Europe, Asia, Africa, America, and Australia attached, yet independent, so that each could illustrate its own climate, industries, resources, and peculiarities in its own way, subject of course to a general regulating control,—a fit representation of our glorious Empire, having the mother-land as a common centre.

I believe I may report that the Legislature of this colony will this year vote a sum of money for a Local Exhibition to be held in this city, prior to that of 1861, for the double purpose of local competition and for subsequent transmission of the collection to London. We shall endeavour, having more time at command, to make a larger collection than that sent to Paris in 1855, which gained the gold médaille d'honneur; the catalogue of which I had the pleasure of handing you in London in 1856.

I hope to be in England in the course of 1860. Having taken part in forwarding collections to Dublin and New York in 1853, and to Paris in 1855, on which latter occasion I acted as Colonial Commissioner during the whole period that the French Exhibition lasted, I think I may venture to say I have had considerable experience; and if my personal services would be of use for the coming Exhibition of 1861, I should have much pleasure in placing them at the disposal of the authorities.

I am, &c.,

W. H. HOLMES,

President of the Royal Agricultural and Commercial Society, British Guiana; Secretary to the Correspondence Committee.

City of Georgetown, Demerara, Feb. 24, 1859.

EXHIBITION OF INVENTIONS.

The Society's Eleventh Annual Exhibition of recent Inventions will be opened on Monday the 25th of April next.

Persons intending to be Exhibitors should communicate with the Secretary of the Society of Arts as soon as possible, stating:—

1st. The Title of the Invention.

2nd. Whether the Article will be a Model, Drawing, or Specimen.

The Articles must be forwarded to the Society's house, carriage paid. The days fixed for receiving them are Thursday the 7th, Friday the 8th, and Saturday the 9th April. No articles will be received after the last of these days.

Articles which have been included in previous Exhibitions of the Society of Arts cannot be readmitted.

Articles should be accompanied by a short but clear description of the Invention, with a wood block (when possible) for illustration, and a reference to any publication in which the Invention is described.

All Drawings exhibited must be framed.

No charge is made for space, and the admission to the Exhibition is free.

CONVERSAZIONI.

The Council have arranged for two Conversazioni during the present Session; the first, on Saturday, the 7th May, at the Society's House, the card for which will admit the Member only; the second, on Saturday, the 28th May, at the South Kensington Museum, the card for which will admit the Member and two ladies, or one gentleman.

EXAMINATION PRIZE FUND FOR 1859.

The following are the Donations up to the present date:—

	£	s.
John Ball, Examiner in Book-keeping (2nd donation)	5	5
C. Wentworth Dilke, Vice-Pres., Chairman of Council (4th donation)	10	10
T. Dixon	1	1
Frederick Edwards (annual)	1	1
J. G. Frith, Mem. of Council (2nd donation)	5	5
F. Seymour Haden (annual)	2	2
— Haldimand	10	10
Edward Highton (annual)	2	2
James Holmes (annual)	1	1
Henry Johnson (2nd donation)	25	0
London Committee of the Oxford Middle Class Examinations	5	5
Charles Ratcliff (annual)	10	10
Rev. Dr. Temple	6	6
Matthew Uzielli	50	0
Rev. A. Wilson	2	2

EXAMINATIONS, 1859.—LOCAL BOARDS.

The following Local Boards have been appointed since the last announcement:—

For Messrs. Chance's Reading Rooms and Library, Birmingham.

Mr. R. L. Chance, jun.
Mr. Henry Chance.
Mr. C. Mapelin.
Mr. F. Talbot, *Secretary.*

For Bury Athenæum.

Mr. John Hocking.
Rev. Canon Hornby.
Rev. C. Hildyard, B.A.
Rev. W. R. Thorburn, M.A.
Rev. J. Westerman, M.A.
Mr. Josh. Pomfret, Athenæum, Bury, Lancashire, *Secretary.*

For the Glasgow Institution.

Rev. Wm. Fleming, D.D., Professor of Moral Philosophy, Glasgow College.
Rev. George Jeffrey, London-road.
Rev. Duncan M'Gregor, A.M., Free Church, Hope-street.
Mr. Thomas Morrison, Rector, Free Church Training College.
Rev. Archibald Nisbet, St. Stephen's.
Mr. Alexander Sim, F.E.I.S., St. Enoch's Parish Schools.
Mr. John Craig, F.E.I.S., 63, Cathedral-street, *Secretary.*

For Ipswich.

Mr. J. E. Champness, Schoolmaster.
Dr. Christian, Professor of Languages.
Rev. J. T. Cooper.
Dr. Drummond.
Mr. Robert Everett, Rushmere, Ipswich.
Mr. John Evans, Schoolmaster.
Mr. Henry Footman.
Mr. C. F. Gower.
Mr. T. S. Gowing.
Mr. J. P. Howe, Schoolmaster.
Mr. Alfred Lambert.
Mr. John Peachey, Schoolmaster.
Mr. John Ridley, jun.
Mr. J. R. Ross.
Mr. Charles Sulley.
Mr. Charles Silburn.
Mr. J. E. Thampness, Schoolmaster.
Mr. Sterling Westhorp.
Mr. John Wiggin.
Mr. Richard Gowing, Mechanics' Institution, Ipswich, *Secretary.*

For Wirksworth.

Rev. F. H. Brett, Rector of Carsington.
Dr. William Webb.
Mr. W. L. Hall, Mechanics' Institution, Wirksworth, *Secretary.*

NOTICE TO LOCAL BOARDS.

Forms No. 1 and No. 2 (see Appendix to the Examination Programme) have been issued to the Secretary of each Local Board, and careful attention to them is particularly requested.

SIXTEENTH ORDINARY MEETING.

Wednesday, March 23, 1859.

The Sixteenth Ordinary Meeting of the One Hundred and Fifth Session was held on Wednesday, the 23rd inst., J. B. Smith, Esq., M.P., in the chair.

The following candidates were balloted for and duly elected members of the Society :—

Crosley, Alexander.
Götzenberg, Herr.
Kirby, Capt. Wm. Frederick, R.E.
Lange, Christian.
Mocatta, Fredric D.
Nash, William Henry, B.A.
Thompson, Henry Attwood.
Webb, Edward.

The Paper read was—

ON THE GROWTH OF COTTON IN INDIA: ITS PRESENT STATE AND FUTURE PROSPECTS, WITH SPECIAL REFERENCE TO SUPPLIES TO BRITAIN.

By J. Forbes Watson, A.M., M.D., F.C.S., Reporter on the Products of India.

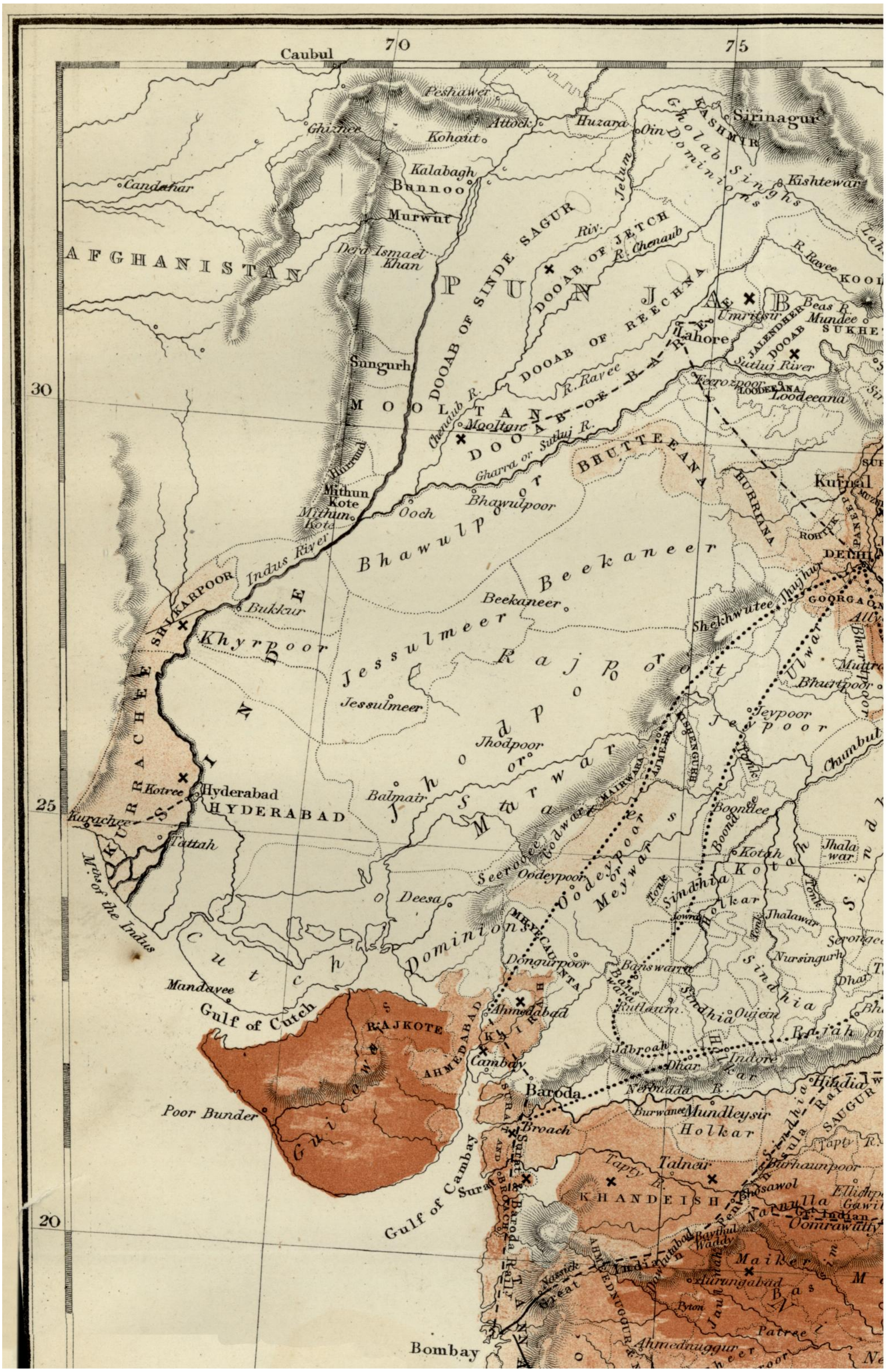
Considering the extent of the subject with which I have to deal this evening, it would be a waste of time to spend much in a long preamble. One remark, however, I must make with reference to the position I hold and the views I take. As Reporter on the products of India, it is assigned, as one of my more immediate duties, to bring before the public any matter of interest in a commercial point of view; and convinced as I am that there is no more practical method of accomplishing this than by bringing such subjects before a Society which has done so much for the true advancement of this country in arts, in manufactures, and in science, I shall, with the permission of the Council, and as occasion offers, avail myself of the present privilege of bringing to public notice, and submitting to discussion, the results of whatever observations I may have to make. At the same time, I have distinctly to state that no official importance attaches in any way to my views; for these I alone am responsible.

I have chosen the subject of the present paper by reason of the interest which attaches to any question affecting the prospective supply of that great staple on which, in no mean measure, depends our prosperity as a nation.

Into what may be called the polemics of the question, important as they are, I have no wish to enter; nor is it necessary: they have received full attention, both here and elsewhere.

The information which I have to impart is derived both from personal knowledge and from reference to works which any one may command. I have also had the benefit of comparing various written documents lately received from time to time at the India-house. From the Statistical Department there—the source of a good deal of unacknowledged information—I have received every assistance. To Mr. C. Prinsep I am, however, under special obligations, as well as to Mr. Mann; and to Dr. Riddell and to Mr. A. C. Brice, my thanks are equally due for having placed at my disposal, not only the results of their own observations, but also private documents of considerable interest. Of Dr. Royle's great work I have of course availed myself; and those who, like myself, have occasion to study and consider, in the light of new facts, the principles which he has laid down, will still more appreciate the great qualities which have rendered his loss a national one. Dr. Royle has been removed from us; but it will be satisfactory to the public to know that there is no reason to suppose that the Industrial Museum at the India House, with which his name ought ever to be connected, will be dispersed, nor that the other portions of the great national collection there, which, with the former, illustrate India in all its departments, will not receive an appropriate home in the new India Office.

In endeavouring to illustrate the capabilities of India for the growth of cotton, two lines of inquiry present themselves. We have in the first place to show that the climate and soil are suitable, and afford the fundamental elements necessary to the full development of the plant; and, in addition, to point out wherein either one or other



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AFGHANISTAN
Sirinagur
KASHMIR
Gholab Singhs Dominions
Kishtewar
Jelum
Riv.
R. Chenaub
DOOAB OF SINDE SAGUR
DOOAB OF JETCH
DOOAB OF REECHNA
DOOAB OF BARREE
PUNJAB
Umritsur
Lahore
R. Ravee
Beas R.
Mundee
SUKHET
JALENDHER DOOAB
Sutluj River
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MOOLTAN
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Chenaub R.
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BHUTTEEANA
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GOORGAON
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KURRACHEE
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Hyderabad
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Tattah
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Cutch
Dominions
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Dongurpoor
Banswarra
Rutlaum
Oujein
Jibroah
Indore
Mandavee
Gulf of Cutch
RAJKOTE
Guicowar
Poor Bunder
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KAIRA
Cambay
Baroda
Nerbudda R.
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Tapty R.
Talneir
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Bhosawol
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Patree
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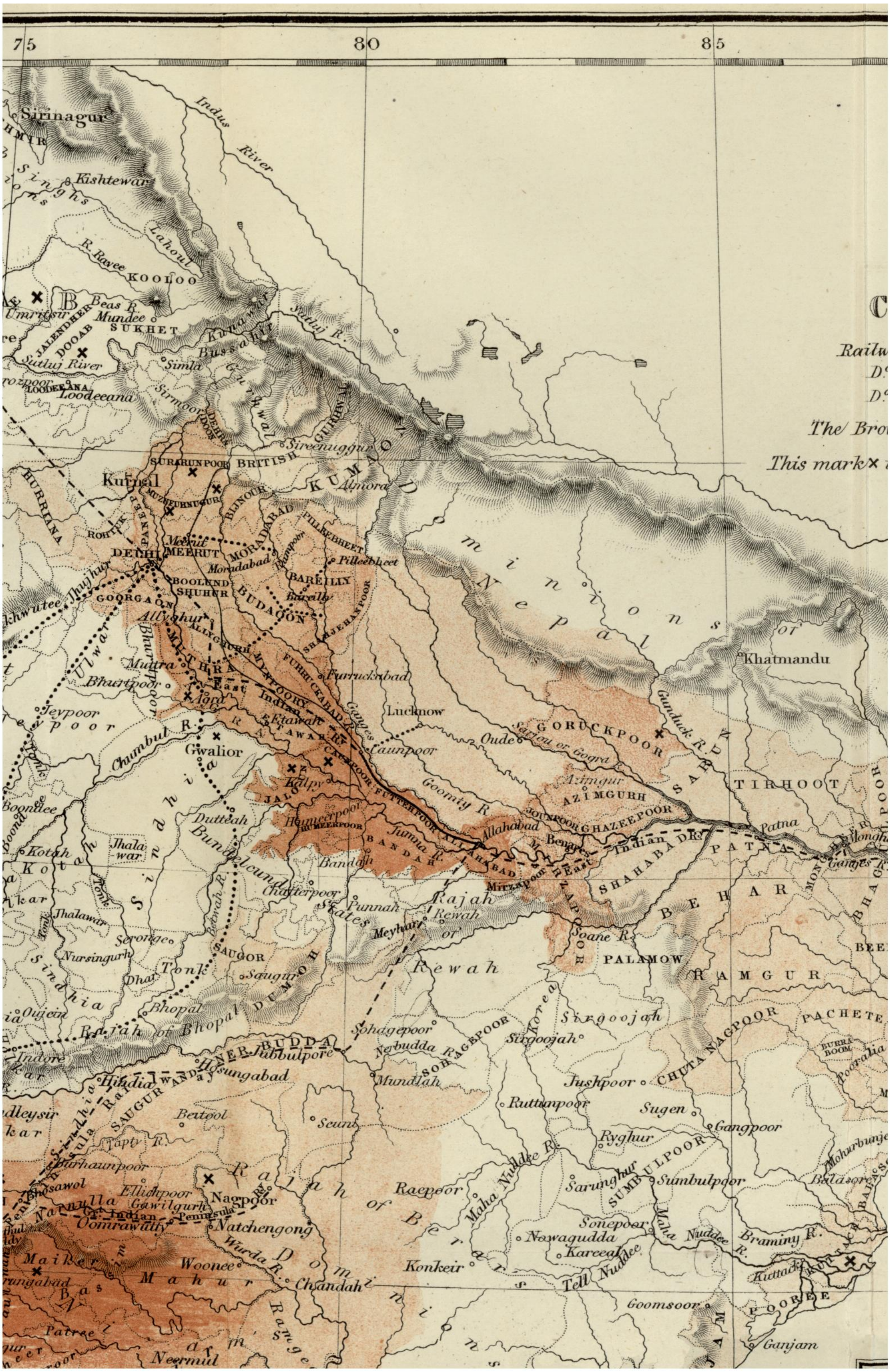
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Gwalior
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Gunges R.
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Chatterpoor
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Oujein
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Rajah of Bhopal
Sohagepoor
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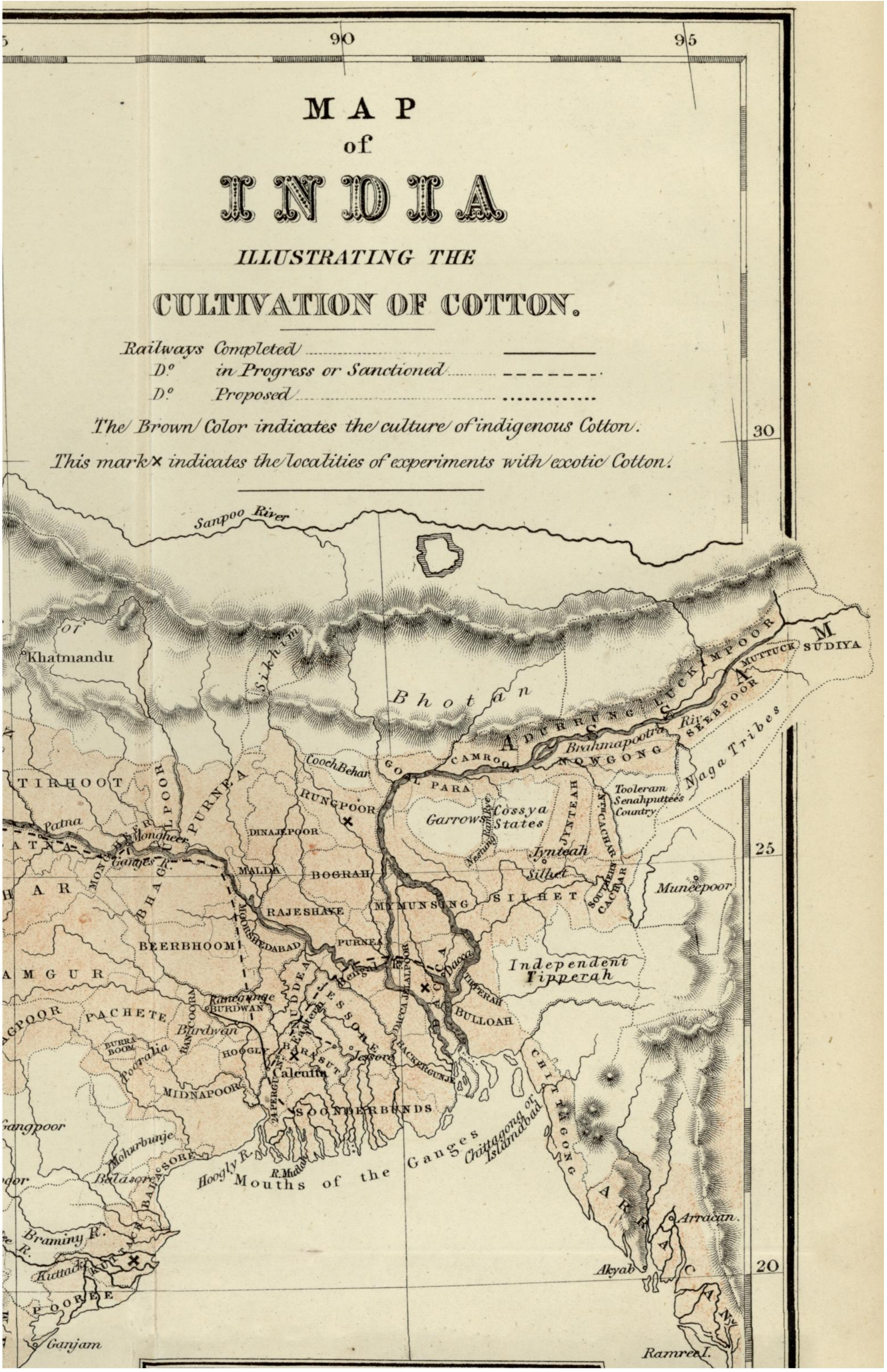


MAP of INDIA ILLUSTRATING THE CULTIVATION OF COTTON.

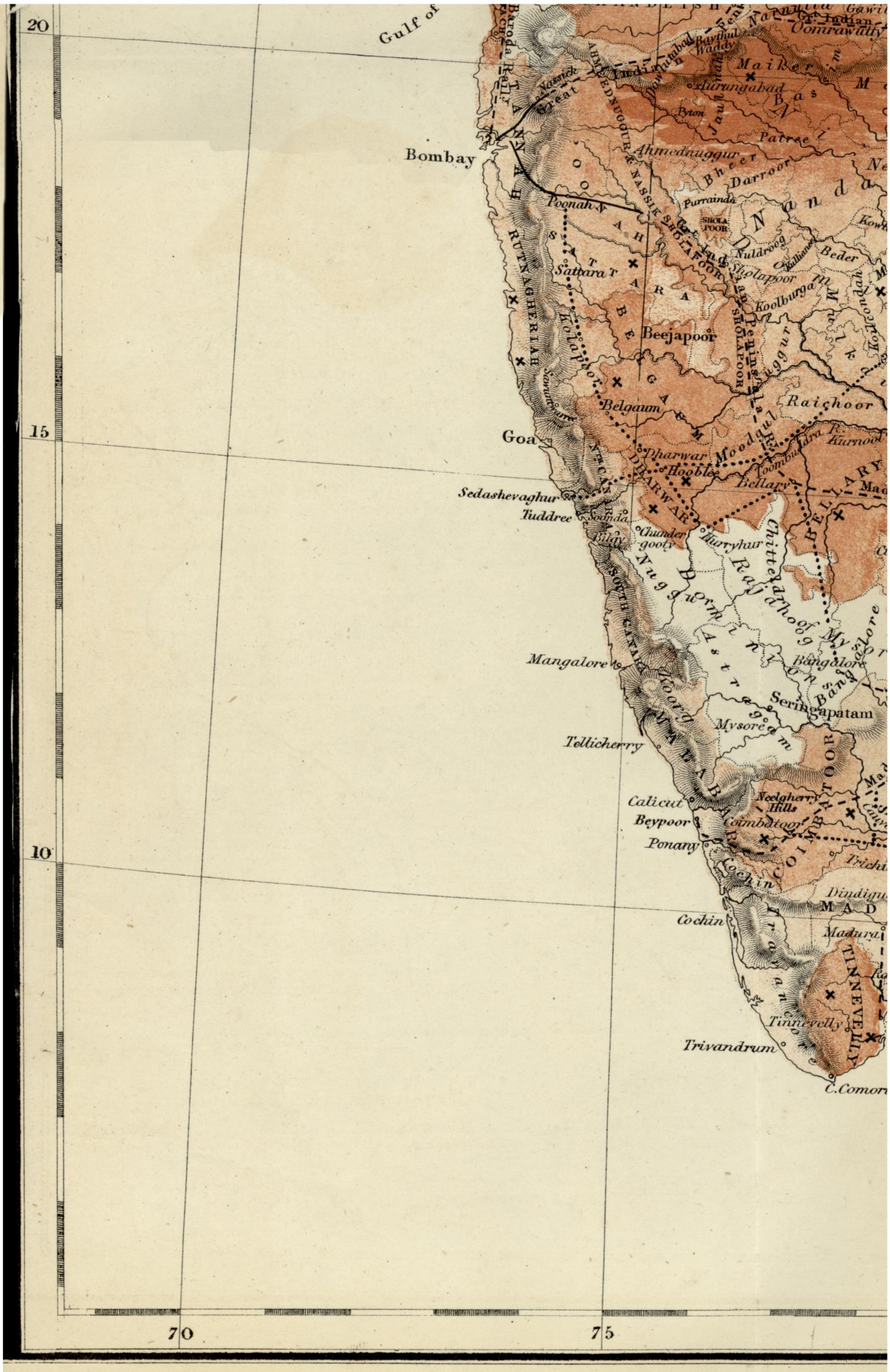
Railways Completed ——

D.º in Progress or Sanctioned - - - - - -

D.º Proposed ....

The Brown Color indicates the culture of indigenous Cotton.

This mark × indicates the localities of experiments with exotic Cotton.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Maiker
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Purrainda
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Nuldroog
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Beder
Koolburga
Sattara
RUTNAGHERIAH
Kolapoor
Beejapoor
Belgaum
Raichoor
Goa
Dharwar
Hooble
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Bellary
Toombudra R.
Kurnool
BELLARY
DHARWAR
Sedashevaghur
Tuddree
Sonda
Chunder gooty
Hurryhur
Chittledroog
Mysore
Bangalore
Seringapatam
SOUTH CANARA
Mangalore
Coorg
Tellicherry
MALABAR
Calicut
Beypoor
Ponany
Neelgherry Hills
Coimbatoor
COIMBATOOR
Cochin
Dindigul
Madura
Trichinopoly
Travancore
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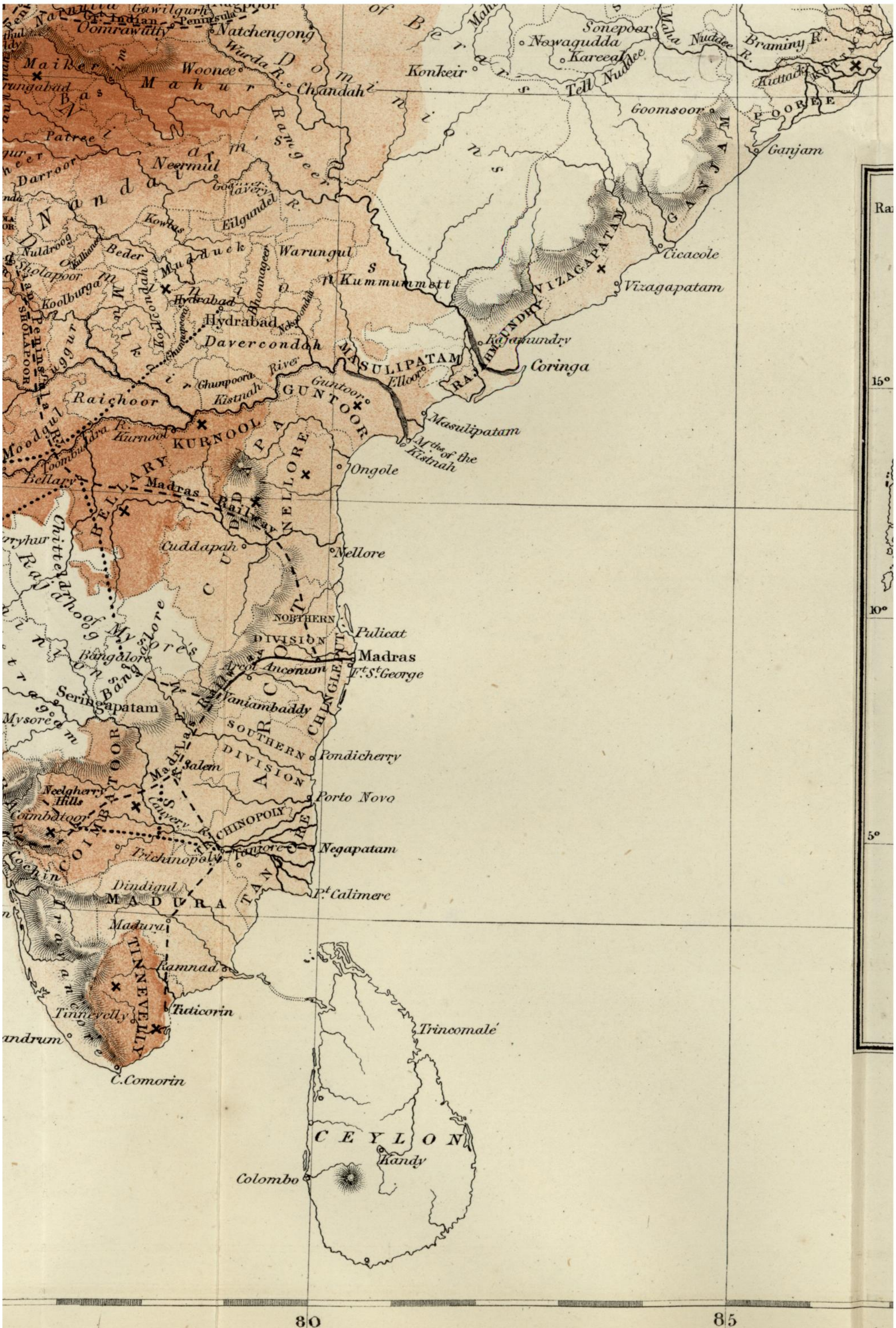
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RAJAHMUNDRY
Rajamundry
Coringa
VIZAGAPATAM
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Toombuddra R.
Bellary
BELLARY
Madras Railway
Chittledroog
Cuddapah
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Rajah
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NORTHERN DIVISION
Pulicat
Madras
Ft. St. George
Arcot
Anconum
Bangalore
Seringapatam
Mysore
Vaniambaddy
CHINGLEPUT
SOUTHERN DIVISION
ARCOT
Pondicherry
Salem
SALEM
Neelgherry Hills
Coimbatoor
COIMBATOOR
Cauvery R.
Porto Novo
CHINOPOLY
Trichinopoly
Tanjore
TANJORE
Negapatam
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Dindigul
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Pt. Calimere
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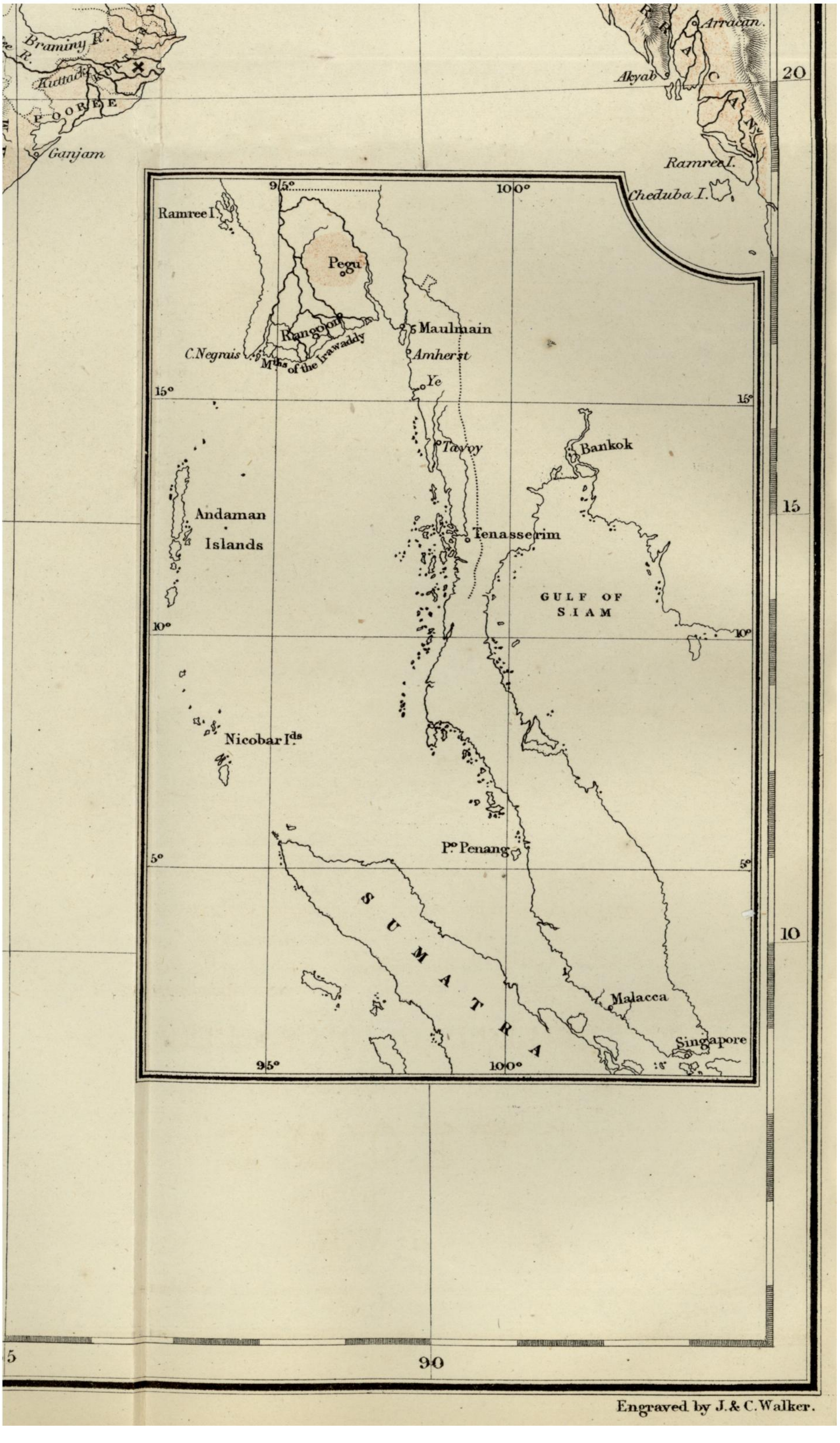

Engraved by J. & C. Walker.

of these is defective for that purpose. In the second place, we have to reply to the practical question—to what extent is cotton now cultivated in India. From the consideration of both classes of facts, we receive a practical reply.

As regards climate, no country in the world of equal extent is so favoured as Hindostan. This arises, to a great extent, from the physical inequalities of its surface, without which India would have been a vast desert. The Himalayas, rising from 20,000 to 29,000 feet, act as the great modifiers of temperature, and provide proper water supply to the rivers in the north, as well as to the atmosphere; while, in the south, the Malabar range of mountains, and the Eastern Ghauts, rise abruptly, and produce, in their turn, similar changes. In India we have the seasons divided into the cold, the hot, and the rainy. The great alluvial tract, to which more distinct reference will soon be made, connected with the Himalayan system of rivers, is subject to greater climatic changes than any other portion of India. There the mean temperature for the year ranges from 70° to upwards of 100°, and the amount of moisture in the air, from the point of saturation to all but absolute dryness. The influence of all this becomes observable when we consider the but partial success which has hitherto attended the culture of cotton in the north of India. In the peninsula of India the climate is different, as it is influenced by two monsoons: the south-west monsoon, which turns loose its torrents on the Malabar and western coast; and the north-east monsoon, which chiefly affects the eastern coast; and in some parts, as in Coimbatore and in Dharwar, the advantages of both monsoons are enjoyed.

The rivers not only locally influence the temperature and hygrometric condition of the atmosphere, but furnish the necessary supplies of moisture to the plant, as well as several of those constituents, both organic and inorganic, in which the soil may be defective. That the water of the Indus contains organic matter—a principle in which the soil of Sind is naturally all but totally wanting—is amply proved, even without chemical tests, by the smell of decomposition emitted when the inundation water has been kept for any length of time; and I find, in a sample of water taken in December, 1857, from the Tambrapoorney, in Tinnevelly, no less than 11·6 grains of organic matter per gallon in solution.

And now as to the soil. Although subject to considerable modifications, the soils of India may be divided into three great classes. In the North, we find great alluvial tracts, the results of countless ages of deposits from the majestic rivers, the Ganges, the Indus, and the Brahmapootra, which, together with their contributaries, fall respectively into the Bay of Bengal and the Indian Ocean. By this alluvial, India may be said to be bounded in the north; but passing southward and eastward from the delta of the Indus, we find the rivers of Guzerat and the intractable Nerbudda, have each afforded its quota to the same class of deposits. On the opposite side of the country, the mouths of the Godavery, the Kishna, the Cauvery, and sister rivers, supply soils identical in physical character; and stretching still further to the eastward to Burmah, extended evidence presents itself of that ceaseless attrition which at last subjugates the hardest rocks.

It is not possible for me to say exactly, or indeed with any amount of precision, how much of the 1,200,000 square miles which comprise Hindostan, consist of the deposits here referred to, but I believe at least one-third does so. Even this kind of soil varies of necessity in physical character, depending much for the greater or less amount of sand or grit which it contains, upon its proximity in past ages to the parent stream, the nature of adjacent soils, and other local causes: but generally speaking, the great alluvial tract of the Ganges and of the Indus is so similar in composition, that the one may be taken as the type of the other. Further on I subjoin analyses of two of these soils, which, along with several others, have lately been examined for me by Dr. Albert J. Bernays. Both are from Sind. The one marked *a* I took with me from Jacobabad, in Upper Sind, in the spring of 1852. It has never been manured or irrigated, and may be considered a fair type of the soil from the plain of the Indus. The second is marked *b*: it is from near Hydrabad.

a is of a light fawn colour, and almost impalpable. 2200 grains were examined, and found to consist of:—

a Impalpable particles	1908·5
b Sand of the finest description	226·5
c Coarse sand	5·0
	2200·0

The composition of the impalpable portion of this may well be compared with another, *b*, an altogether impalpable soil. In 100 parts both soils may be said to consist of:—

	a	*b*
Water	4·130	2·500
Organic matter	0·040	merest trace
Cloride of sodium	0·003	0·006
Sulphate of lime	0·005	0·064
Phosphate of lime	0·084	0·008
Carbonate of lime	10·228	21·810
Carbonate of magnesia	0·034	0·113
Lime (probably as silicate)	0·120	0·135
Protoxide of iron	7·200	2·240
Alumina	16·400	15·080
Potash	0·110	0·103
Silica soluble	trace	0·131
Silica as sand, and combined with aluminium, &c.	61·550	57·249
	99·904	99·439
Loss	0·096	0·561
	100·000	100·000

Whatever is defective in these, considered solely in a chemical point of view, is capable of being supplied by the waters of the Indus. Irrigation is essential, not merely as bringing water, but also organic matter, and certain, though small quantities of salts, such as gypsum and common salt.

The next soil to which I would direct attention, is the well-known "black cotton soil" of the Deccan and other parts of India. In extent it occupies a position next to the alluvial. It stretches from Bundelcund in the north, nearly to the south of the Peninsula. A very considerable portion of the Deccan consists of this; it is also to be found in Guzerat and many other parts of the country. In depth it varies much. As to origin, it seems to have arisen from the decomposition of basalt and trap, which constitute, to a great extent, the mountain ranges on which the great plains of the Deccan are elevated, and the analysis confirms this supposition. The lime in which the parent rock is probably defective, it derives from other sources, so that nothing is wanting to develop perfect growth.* When dry it is dark coloured, and glistens from the presence of nearly pure grains of silica. It exhibits distinct traces of fibre, as also specks of limestone and minute shells. For water it possesses extraordinary attraction: it forms with it a most tenacious mud, and readily bakes into a brick.

1,500 grains were carefully washed with water, and afforded:—

	Grains.
a. Fine, almost impalpable powder	1075·
b. Small calcareous nodules or *kunkur*, removed from *c* by washing with dilute hydrochloric acid	75·
c. Fine sand, small silicious pebbles, and felspar	350·
	1500·

*** These points are more fully discussed in a work now in the press, the appearance of which has been delayed from the pressure of more immediate duties.**

The fine powder, *a*, consisted of, when reduced to 100 parts:—

Water	11·400
Organic matter	2·500
Chloride of sodium	0·068
Sulphate of lime	0·074
Phosphate of lime	0·016
Carbonate of lime	9·250
Carbonate of magnesia	trace
Peroxide of iron	5·680
Alumina	14·320
Potash	0·014
Soluble silica	0·008
Silex combined, but chiefly free as fine sand	56·830
	100·160

The calcareous nodules consist, as the name denotes, chiefly of carbonate of lime, but contain also oxides of iron and aluminium. The coarser particles, *c*. contain as much as 0·187 per cent. of potash; this is undoubtedly derivable from felspar.

On the very face this soil bears the marks of undoubted fertility; in depth, too, it more than equals the far-famed prairie land of America. In a report lately received from Captain Meadows Taylor, I find it stated that in the centre of the valley of North Berar, the shafts of wells pass through from 90 to 120 feet of black earth and greyish clays; and throughout the greater portion of the plateau of the Deccan, this soil may be said to vary from 3 to 15 feet in depth. In many places it hardly contains even a pebble of any kind.

In referring to an analysis of a similar soil by the late Mr. Piddington, I find that the iron is stated to exist in the form of protoxide. I can only state that neither Dr. Bernays nor myself have found the iron in any other form than the peroxide.

The next and last soil of which I would here make mention, is one found in all parts of the country, but perhaps chiefly in Southern India, where it apparently mainly arises from the decomposition of granite rocks. Its lime and some valuable constituents are, however, obtained from different sources. In other parts of India this soil would seem to take for its origin rocks of a volcanic description, such as the red jaspery brick-like *Laterite*, which is found extensively in many parts of the country. The soil of this class, of which the analysis is subjoined, is from Bombay.

The quantity examined was 4,500 grains. It consisted of:—

	Grains.
a. Impalpable powder	936·0
b. Very fine soil	3324·0
c. Coarse pebbles, like jasper, with pieces like burnt tile, strongly retentive of moisture	240·0
	4500·0

The impalpable portion consisted of:—

Water	18·000
Organic matter	0·450
Chloride of sodium	0·083
Sulphate of lime	0·007
Phosphate of lime	0·027
Carbonate of lime	0·450
Carbonate of magnesia	0·013
Peroxide of iron	15·200
Alumina	16·500
Potash	0·085
Silica combined and free as sand.	48·000
	98·815
Loss	1·185
	100·000

The very fine soil *b* contains 0·012 per cent of phosphate of lime.

It is obvious that this soil, in spite of its density (which is, of course, much modified by the presence of sand and pebbles), likewise contains every element of vigorous growth.

Such are a few of the facts which have fundamental reference to the capabilities of India for the extended growth of cotton, that is, supposing there is nothing in the habitat of the plant itself which insists on climatic conditions only to be found within small limits. And this brings me to the next division of my subject,—to that which refers to the evidence afforded by the plant itself. Here I would remark there is reason to believe that from time immemorial the cotton plant has been grown in all parts of India, and has always afforded suitable covering to the people of the country. Not only does it serve for clothing, but it answers all the several purposes for which flax, wool, hemp, and hair are employed in this country. It may be indeed impossible to state the exact quantity per annum thus consumed; it has been variously estimated at from 5 to 20 lbs. per head for the whole population. If we assume 12lbs., as likely to be near the mark, we shall find that the present population of India, calculated at 180 millions, requires annually two thousand one hundred and sixty millions of lbs.; and, if we further adopt Dr. Royle's average of 100lbs. as the yield of native cotton per acre, we shall find that there cannot be less than twenty-one million six hundred thousand acres under cotton cultivation, exclusive of that which supplies the present exports of raw cotton. These on an average of the last three years amounted to 272,395,875lbs.;* and this again divided by one hundred, will add 2,723,958 acres to the former quantity. The total quantity of cotton grown in India, according to the above calculation, will consequently amount to upwards of two thousand four hundred millions of lbs. (2,432,395,875lbs.) per annum, and demand for its culture certainly not less than twenty-four millions of acres.† The production of this enormous quantity of raw material is, of course, spread over the length and breadth of the land; indeed, a considerable portion of it is the result of garden cultivation to supply the local wants of the people. The map‡ which accompanies this paper indicates by darker shades those districts where the culture of cotton has been, so to speak, intensified. It purposes to give a view of those tracts of country which are at present most productive, and which yield the largest quantity of cotton, as well for home consumption and manufactures as for export.

The causes which have determined the extra productions in certain parts of the country are of two kinds. The first refers to the peculiar capability of the soil and climate of the parts indicated; the next to demand, which has acted as the exciting cause; and a more interesting investigation could scarcely be undertaken than one calculated to exhibit, over long periods, those changes which have arisen partly from the decay of power to meet protracted demands, partly from the establishment of fresh and more effective sources of supply. The home market of India has always been subject to the usual influences which arise from the existence of competition. In days gone by the sea-borne cotton of Surat competed in the Bengal market with the river-borne produce of Bundelcund and with supplies from Berar, which had to be conveyed 400 miles from the interior. And here I would remark that no better practical test of the relative capabilities of the cotton districts of India can be obtained than that which has reference to the power of yielding a continuous supply in the face of great export difficulties; and further on we shall have occasion to refer more particularly to this last point, when condering the prospective supply to this country. Let us glance at this part of the subject. It does not appear improbable that in remote times Bengal grew all the cotton she required for home consumption as well as for manufacture. Shortly, however, after our acquiring possession of the country we find that Bengal did not produce enough for her own use, nor one-eighth of that required for her manufactures, which had been greatly stimulated by the new demand for cotton goods for general use in Europe. Orissa, at the period of which we speak, became likewise another great seat of the manufacture of cotton cloth for Europe; and, in addition, Injeram and Madapollam, in the northern Circars, wrought up large quantities of staple for the same purpose. Let us now apply the test before proposed. Here we have three great sources of demand. Anteriorly to 1783 the two first certainly, probably also the last, were supplied from Surat. Then war arose in Guzerat, which interrupted and diverted the supplies; and, apparently coincident with this, we find the first importations into the lower provinces of river-borne cotton from Bundelcund, and probably also the Gangetic Doab. The necessity once created, other sources of supply rapidly came into play; as a result of which we find (as stated above) that after a very few years cotton was conveyed from Nagpore in Berar over a space of 400 miles on the backs of bullocks to Mirzapore, on the Ganges, and subsequently nearly 500 miles by river, competing successfully and permanently with the sea-borne cotton of Surat, as well as with that by river from the north-west.

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* See bottom of column T, in Table II. This includes cotton to Britain, China, and all other parts.

† This is exclusive of the ground required to grow the six millions of lbs. weight of manufactured cotton exported yearly from India. See Table II.

‡ By Mr. Walker. Presented to the Society by the Secretary of State and the Council for India.

In 1789 the Nagpore cotton, from its superior quality, held the first place in point of value, and constituted two-fifths of the total quantity supplied to Bengal. At that period it is calculated that the price of cotton at Berar could not have much exceeded one penny per pound: and then, and for some considerable time afterwards, we find the third head-quarters of demand to which we have referred, viz., that of the Northern Circars, chiefly supplied from the same source. And it must be borne constantly in mind that to accomplish this end, the Nagpore cotton had to bear the expenses of a journey southwards of upwards of 400 miles, one-fourth part of which had to be undertaken through dangerous jungles and a most disordered country.

We have already stated that cotton is the material for all clothing worn in India. It is not there as with us, where the linen and woollen manufacture share with cotton. For at the period of which we are speaking, the cotton manufacture was of very limited use in Europe, and none could then have predicted the present throb of anxiety to obtain the raw material wherewith to manufacture what sixty years since we obtained entirely from the East. How vast the change! The export trade of India in manufactured cottons has almost passed away, and she is daily becoming more and more the receiver of what was originally all her own. The causes which have led to this result—the inventions of Hargreaves, Arkwright, Crompton, and of Watts—are well-known. I shall, therefore, return to the production of cotton in India.

Sixty years since, as we have seen, Guzerat, Berar, Bundelcund, and the Gangetic Doab monopolized almost the entire export trade of raw cotton. Thus the indigenous cotton of India has supplied for ages the wants of the inhabitants, and in these latter days furnished fabrics to Europe of unequalled delicacy and beauty. But in the process of manufacture by machinery it is found, that for some purposes Indian cotton, which is naturally short in the staple, is not so suitable as the longer variety furnished by the Southern States of America, and usually called New Orleans cotton. Although no doubt exists about this fact, it is to be remarked that the increased price of the last few years, and the prospect of insufficient supplies from the States to meet the rapidly increasing demand for cotton goods, have of late produced a considerable modification in the views of our manufacturers as to the suitability of Indian cotton for extended employment in their mills; and I believe I am correct in stating that it is generally admitted, that Indian cotton, with all its imperfections, is capable of being employed in the production of 75 per cent. of our manufactures.

It is most desirable, however, that the New Orleans variety of the cotton plant should, as far as possible, be cultivated in India: this subject, for fifty years has received the earnest attention of the Government, and in furtherance of it immense sums have been expended. Were I to present even the most meagre details of the experiments which have been made both by Government and private individuals, whose enterprise is above all praise, more than the whole of my time this evening would be occupied. I prefer, therefore, to deal with results, and with any other facts which may pertain to this division of my subject.

In the map, I have indicated by means of crosses (✕) the situations where these experiments have been conducted; and it will be at once observed that almost every district has furnished opportunities for these.

The results deducible from experiments conducted on the great alluvial tract previously described, and which, with certain modifications, embrace Bengal, the North West provinces, the Punjab, and Sind, taken in connection with the past history of the question, and in view of those considerations which arise from the analyses, may be briefly stated. In the lower part of Bengal, in the rich soil of the delta around Dacca, the experiments with American cotton failed, partly from apparent causes, partly from climatic disasters of an exceptional character. Here, as in Sind, the greatest preventive of extended cultivation arises from the ravages of insects, which attack and ultimately destroy the plant. I must, however, state my belief that, with irrigation, *properly* employed, hopes may be entertained that the long-stapled South Sea Island species, the *Gossypium Barbadense*, as well as the ordinary New Orleans or Upland cotton—the *Gossypium Peruvianum*—might be turned to account. But just as we have found it in days past, Bengal is not likely to afford any extensive supplies of native cotton, which has all along been held in bad repute here. Passing northward to the moist valleys of the Sikkin range, we entertain from Dr. Campbell's late experiments some hopes that eventually the long-stapled cotton may succeed there. The same remark applies to other valleys connected with the mountain ranges of the north, which possess moister climates and a more equable temperature than that afforded by the plains. Turning to the north-west provinces, and likewise to Oude, and embracing the Punjaub and Sind, considerations connected with the soil, the climate, and the past history of the country, lead to the conclusion that, by irrigation alone can we expect to obtain from these places any extensive supplies of either native or exotic cotton. Of late years we have had abundant evidence, that, with judicious irrigation, the yield of clean cotton obtained per acre is likely to become very considerable. Sir John Lawrence states that in the Delhi division from 224 to 384lbs. of clean cotton has been grown on some lands by irrigation; and in Rohilcund, without this adjunct, large crops are occasionally obtained. The average yield per acre in the north-west provinces is estimated by Dr. Royle at 162lbs.; and it must be noted, that, although many plantations in the United States yield from 200 to 400lbs. per acre, yet the average yield of all the cotton states is not more than 530lbs. of seed cotton, or from 132 to 176lbs. of clean.*

*** See Ellison's excellent Handbook of the Cotton Trade, p. 18. The proportion of wool to seed therein stated seems rather too high; it varies from one-third to one-fourth.**

Accounts from the Punjab show that excellent cotton may be produced there; it presents a fair field for efforts in this direction, as well as for the cultivation of the other great staple, flax, about which a wholesome anxiety is now being manifested.

From Sind, the scene of Mr. Frere's enterprising efforts, we have late accounts, showing promise for the future. In Upper Sind the yield per acre has been very small, amounting to but 39lbs. of clean cotton; but in Hyderabad, Kurrachee, and in the delta of the Indus 244 lbs., 159 lbs., and 124 lbs. have respectively been obtained. These, however, are maximum quantities; the average for Middle and Lower Sind being 104 lbs. Hitherto the indigenous cotton has succeeded much better in Sind than the exotic or American species, failure being attributable to excess of moisture from inundations, and from the boll-worm, which has proved most destructive. In no part of India is the regulation of moisture under greater control, and there can be no doubt that, with care in its application, more attention to the selection of seed, and other points connected with the cultivation of the plant, it may eventually furnish some considerable supplies to this country.

Passing southward and to the east we come to Guzerat, embracing under that name, Surat, Broach Kaira, Ahmedabad, and Kattywar, which at present yield a larger quantity of cotton for export than all the rest of India together. This extensive tract of country is then the same which, even towards the close of last century, we found to supply a portion of the wants of Bengal. No district has received more attention, and in it numerous experiments have been made with a view to establishing the growth of exotic cotton. This attempt has hitherto so far failed; but the indigenous, compared with other Indian cottons, holds a good place in the market in point of quality; and were it not for the carelessness of picking, and the systematic adulteration which it oftentimes receives, it would command a better price.

Although, then, the general character of Indian cotton is bad, on account of its condition, it is an extremely interesting fact to know that Mr. Landon, who has established himself at Broach, in the two capacities of spinner and manufacturer, obtains cotton well suited for all his purposes, and which enables him to turn out No. 40 yarn from what here only produces No. 16. This amply proves that parties interested, and on the spot, can procure better cotton than is sent into the general market, Mr. Landon's secret of success being, that he refuses to purchase a dirty article. The culture in the districts we are now considering is admitted to be about as perfect as any that exists; in some respects, indeed, it is superior to what is practised in most parts of the Southern States of America where the same strict attention to fallowing and rotation is not observed. The introduction of irrigation would doubtless improve it, by preventing the effects produced by the drought which follows so immediately upon the rains, and which dries and shrivels the plant at about the most important part of its growth. No districts present greater facilities for export, and as a consequence we find that whenever the demand for Indian cotton is excited by an enhanced price in Liverpool, the export steadily increases. This is well shown in the accompanying table, the upper columns of which indicate the quantities sent from the various specified districts between the years 1852 and 1857, both inclusive. From this it will be seen that in the latter year the exports amounted to 196,809,872 lbs., whereas, in 1852, to only half the quantity. That this increase was mainly due to the rise of price at Liverpool, can be abundantly proved, and will be again referred to in our general summary; it also exhibits the great export elasticity, so to speak, of these districts, and contrasts favourably with others yet to be mentioned.

Amongst the inland districts alluded to in the table are Candeish, Ahmednuggur, Poona, Sattara, Sholapore, and Berar; of these the first and last are most important. Their capabilities are very great, especially those of Berar, which seems destined to occupy a high position in supplying our wants. It is true that at present the quantity grown at Candeish is trifling, but the experiments of Mr. A. Elphinstone, of Mr. Price, and of others, show that even American cotton can be cultivated. And there is no question but that, with proper means of irrigation, and increased facilities for exporting the products of the soil to the coast, Candeish will soon occupy a very high position. At present the cotton has to be conveyed in carts over bad roads, a distance of about 180 miles, to Colset Bundar, the nearest point to Bombay, which receives for shipment to England all that is grown on the western side of the continent.

TABLE I.*

PLACES OF GROWTH.	YEARS.				
	1852–53.	1853–54.	1854–55.	1855–56.	1856–57.
Surat, Cutch, Broach, and Ahmedabad .	99,923,544	106,888,992	58,119,096	143,656,534	196,809,872
Candeish, Ahmednuggur, Poona, Sattara, Sholapore, and Berar	75,488,224	63,066,136	40,537,504	59,440,528	65,243,304
Belgaum, Dharwar, Raichoor, Bellary (west side), and Kurncol	39,200,000	17,640,000	13,284,096	13,565,160	29,008,000

With regard to Ahmednuggur, Poona, Sattara and Sholapore, little need now be said, as the quantity grown is so small; but this will scarcely continue to be the case if better facilities of carriage are offered. I must, however mention that all attempts to grow the American cotton here have hitherto failed.

Turning now to the valley of Berar, which, in times past, competed so successfully against great odds with apparently more favoured districts. For a number of years the trade current of Berar flowed entirely northwards to Mirzapore on the Ganges, but in 1824-25 an attempt was made, headed by our noble-hearted Parsee Baronet, Sir Jamsetjee Jeejeebhoy, to establish a traffic in cotton between Berar and Bombay. The decline of the Bengal manufactures aided the effort, and shortly afterwards we find the westward current so fully established that, in the year 1846, it was calculated that not fewer than 180,000 bullocks were employed in the conveyance of cotton between those two places. Soon, however, a maximum export quantity was reached, due to the limits placed upon this sort of conveyance; and the result has been that, unlike the sea-washed borders of Guzerat, whatever has been the prevailing price in the market, the quantity sent from this prolific valley of Berar has remained almost stationary. Indeed, Table I. exhibits the fact that, in spite of the present prices of cotton, both Berar, Candeish, and other inland territories similarly placed, owing to imperfect communication and insufficient means of carriage, have considerably declined in their exports to Bombay. The usual law of supply following demand is powerless in the face of such difficulties. But of the eventual power of Berar and the adjacent country to supply more than one-third of the thousand million of pounds of raw material now yearly required for our factories, I believe there can be no doubt. Looking to the capabilities of this huge tract of country, which may be considered, *par excellence*, the great cotton field of India, having regard to the great skill of the cultivators, and the cheap rate at which it can be grown, we are warranted in looking to it with much hope, and in the full expectation that it will yet materially assist in making Great Britain less dependent upon slave-grown cotton. The whole history of this portion of the country bears out the view entertained of it.

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* Taken from an excellent paper, by Mr. A. C. Brice, and received from the Railway Department at the India Office.

The indigenous cotton of Berar is, in excellence of quality, second to none that is grown in India, and we conclude from the experiments of Dr. Riddell, and from those which have been made by others following in the same track, that the New Orleans plant will perhaps succeed, and may yet be cultivated. Our wants, however, are pressing, and the practical fact remains, that we are free from all doubts as to success in the extended cultivation of an article which will suit the majority of our purposes. All that is wanting is improved means of exit to ensure a speedy development of the supply.

From Berar, although there are many points connected with the soil, climate, and mode of cultivation, over which I would fain linger, I pass to the consideration of another great and important tract of country, likewise forming a portion of what may be included among the upheaved plains of the Deccan. I allude to Belgaum, Dharwar, Raichoor, the west side of Bellary, and Kurnool, to which some of the remarks made as to Berar, Candeish, &c., are likewise applicable. What I have said with reference to intercommunication and export is borne out again by referring to Table I. Here, although the inducements to export largely came into fair force two years before the last one mentioned in the table, and although these districts had the advantage of energetic endeavours on the part of a gentleman whose name I have already had occasion to mention this evening, and who will, I dare say, favour us with some of the results of his experience in this matter, still the general fact remains. With very considerable demand, and large supplies in the interior, the difficulties of transit are such that the increase of exports from these parts, although marked, are comparatively speaking trifling. The Dharwar district, well known to some here as the scene of Mr. Shaw's enterprising and successful endeavours to introduce the culture of New Orleans cotton, boasts a climate within the influence of the two monsoons. Although the rainfall in inches is not much greater than in many other inland parts of the country, the climate is moister, in consequence of the passage of the monsoon vapours which spread over the country at the usual periods, and thus affect the hygrometric condition of the air. There it is that the best success has attended the introduction of the American cotton. The soil at a trying season of the year (in October) receives fresh supplies of moisture, and consequently the plant is not subject in Dharwar to those droughts for which, in other districts, irrigation can alone prove a remedy. Here, as the result of Mr. Shaw's successful efforts, as well as Mr. Mercer's judicious arrangements, the people themselves have taken up the culture of the American variety of the plant. Unfortunately, however, a serious depreciation of the Dharwar cotton has arisen from sowing American in the same field with indigenous, and unless this be discouraged, great mischief must result.

The extent of land under cotton culture in the Mahratta country extends over a million acres, and it is asserted, on the best authority, that three times that amount is well adapted for the purpose. The present amount grown in this large territory, as well for home supply as for export, is estimated at 51 millions of pounds; but supposing the statement of acreage under culture to be correct, this is probably considerably under the mark, as we have reason to believe that the yield per acre is not less than 80lbs., and it sometimes attains to 120lbs. At present the produce has to be conveyed by land carriage a distance of from 150 to 200 miles to the fair weather port of Tuddry. The difficulties of transit are such, that the expense of carriage per mile amounts to from 4d. to 7d. per ton; or taking 150 miles as the average distance, and 5½d. as the average cost, we find the present expense of simple conveyance to the coast amounting to £3 10s. per ton, or to more than the freight of over 13,000 miles of sea to England. Great exertions have been made to improve the communication to the coast, but hitherto without success; the failure arising from the nature of the soil, and the absence of suitable materials for macadamising the roads. Nor is this a solitary case, as probably more than one-half of the best lands of India are subject to the same drawback. The difficulties in many parts, in the way of forming hard and durable roads, are all but insurmountable. There are vast tracts of fertile country in India, which hardly afford a stone of any kind, and which by rain are rapidly converted into a tenacious mud, into which carts sink axle-deep. The famous black soil we have found to be pre-eminently of this description, and frequently also the red. The difficulties, therefore, opposed in many places to the opening up of the country by means of common roads, are of no ordinary kind. But this matter of conveyance is not the only difficulty which India cotton experiences before it has a chance of entering the Liverpool market. In addition to the actual expense of carriage to the coast—returning to the case of Dharwar—we find the cotton subject to damage from water, to charges for sea transit to Bombay, and then to charges there, all of which amount to about £1 15s. per ton. In the cases we are considering, the cotton is very often delayed at the place of growth for months after it is cropped, owing to the monsoon closing both the coast and roads; and it is admitted that the deterioration in value of the cotton so delayed is equal to ¼d. per lb.

The expenses may be thus summed up: taking the cost of raising the cotton at 1½d. per lb., adding another 1½d. per lb. before it gets to Bombay, and setting down the transit, &c., to England at another 1d., the cotton cannot be sold under 4d. per pound.

Again, taking the produce of the million acres under consideration, we find that the depreciation of ¼d. per lb. above alluded to, would amount of itself to £53,000, supposing of course that the whole quantity should, under present circumstances, be exported.

One more remark as regards this portion of the country. I may mention that in the Southern Mahratta country as elsewhere, the American cotton is found to grow best upon the red and light soils, the capacity for moisture of which is usually considerably less than that of the black; the latter, however, yields excellent crops of indigenous cotton.

Passing southwards over the great plateau which forms the Mysore territory, and which apparently by nature is not calculated to assist much in the supply of cotton, we come to Coimbatore, which, viewed as a probable field of prospective supply of the more valuable exotic species, fully ranks in importance with Dharwar and Belgaum. It was here that Dr. Wight's experiments, which have excited such interest in this country, were conducted. Coimbatore slopes down from the base of the Neilgherries, opposite a remarkable depression or gorge in the western Ghauts of about 16 miles in breadth, and through which the influence of the south-west monsoon is permitted to bear on the country. Like Dharwar, it also receives supplies from the north-east monsoon. The results deducible from Dr. Wight's experiments may be briefly stated.

The quality of the American cotton grown in the Coimbatore experiments was superior to any previously obtained in India: that grown in the red soil was at the time considered in Manchester quite equal to the qualities of the New Orleans cotton grown in the United States, and it fetched from 1d. to 1½d. per lb. more than the native. The returns of seed cotton from the American kind were as a rule more than from the native, and the proportion of wool to seed is stated to be greater in the exotic kind to the extent of from 7 to 9 per cent. The general accounts on this point lead to the conclusion that "kupass" or seed-cotton, of the American species grown in India, as a rule, yields from 29 to 33 per cent. of clean cotton; whereas that procured from native only averages from 21 to 25 per cent.* The yield of seed from the exotic kind is consequently less than from the native; and as the whole of the seed from the cotton in India, except that retained for sowing, is required for feeding purposes, it offers an additional inducement for growing the native variety, more particularly in those districts where grain and grass crops are either normally difficult to raise or subject to damage from atmospheric and other vicissitudes. And although doubtless cattle will eat of seed from both kinds, still, from the greater difficulty of separating the wool from that of the American, the practical result is, that it is more woolly and less suited as an aliment. Be the reason, however, what it may, there is no doubt of the fact, that in all the districts into which the American plant has been introduced, the seed of the native variety has invariably been more esteemed, and fetched a higher price; and with these circumstances in view, this preference may fairly be held to be reasonable. Greater attention to the grain crops on the spot, or the opening up of communication with the districts which are better calculated than many of the cotton ones for the production of food materials, will, however, tend to remove this unwillingness on the part of the cultivator, even should not the enhanced price for the superior wool induce him to do so. Under present circumstances this is a matter of extreme difficulty, as it is the grasping policy of native agents, or middlemen as they are called, to let the poor ryot profit as little as possible from any of the changes which the influence of Government officials or others may have induced him to make. Improved means of communication, or, in other words, the circulation in the district of European agents with money in their hands, and who will be prepared to demonstrate to the cultivator what crops they really do prefer, and for what they will pay most, will remedy this state of matters. Thus alone will demand produce supply.

We must, however, hasten very briefly to refer to the other districts on the eastern coast, all of them important, and which at present have supplies for export over and above their own natural requirement. We allude to the east side of Bellary, Guntoor, Cuddapore, Salem, Madura, and lastly, at the extreme end of the peninsula, Tinnevelly, which is one great source of supply to China, and at present sends out fully more than all the others put together, although there is every reason to believe that these also will in course of time occupy an important place in supplying raw cotton and many other valuable products besides. The quantity of ground in the regions enumerated suitable for the growth of cotton amounts to many thousands of square miles, and I cannot do better than close my remarks on this the last division of India proper, with some statements of Dr. Wight on this point. Taking the four southern provinces of the peninsula—Coimbatore, Salem, Madura, and Tinnevelly, Dr. Wight calculates that these afford 4000 square miles (a mere fraction of India) which might and would annually be under cotton culture in the event of a rise in price of only ¼d. per lb. in the local market. Consequently, at the rate of only 100lbs. of picked cotton per acre, we should obtain from those districts alone 256,000,000lbs., or more than that at present received from the whole of India.

With the exception of Cuttack, Chittagong, and Burmah, we have now passed rapidly, and so far imperfectly, under review the whole of those parts of India in which cotton is cultivated. Chittagong has long shown some export capacity; and reports which I have before me from Burmah, lead me for the last time to apply the term "fair hopes for the future."

Taking into consideration the time yet at my disposal, I can only follow out one of the two branches into which my subject divides. I might enter upon a minute investigation of the various points connected with the cotton culture and manufacture: a description of the native modes of preparing the field for its reception, and the implements employed; the mode of sowing, together with the questions connected with the times so suited in the different parts of India; the amount of attention paid to subsequent weeding; and the periods occupied by the growth of the plant. I might describe the removal of the cotton from the field, and the various questions connected with adulterations, either wilful or accidental; the separation of the wool from the seed—the foot-roller and the churka—the importance of the introduction of cheap and effective gins; the preparation of the wool for the market; its removal to the delicate and sensitive hand of the native spinner, and the simple method adopted for ages in the preparation of their yarns and the manufacture of their cloth; the question of superior durability, compared with machine-made fabrics; and, lastly, the consideration of the principles which ought to be observed by our manufacturers here, in order to produce materials both more adapted for the climate in texture, more in accordance with what experience has taught the people to be most suitable for their wants, and in appearance such as will captivate the eye. I might enter upon these points, but I shall better consult the interest of my present audience by proceeding to discuss those which have a more distinct bearing on the question of the prospective supply of Indian cotton to Great Britain.

I have already endeavoured to give a sketch of the general capabilities of almost every part of India for the growth of cotton, and I have shown that, independently of the large quantities grown for local consumption, certain districts are wholly occupied with its cultivation for export. Thus we have seen, that the sea-indented lands of Guzerat, with its comparatively numerous outlets, have, ever since our acquisition of the country, and probably long before, been one of the chief sources of supply to other parts of India in their palmy days of manufacture, and we have found these, within the short space of five years (Table I.) doubling their exports to meet our wants. Again, passing into the interior of the country to Berar, we find a huge tract which from its superior cultivation and produce has, in the face of enormous transit difficulties in days past, been able to supply places distant from 400 to 1,000 miles; and even now, with prices much below those of former years, finding it sufficiently remunerative to admit of an exit stream of some importance, although limited by causes which are evident.

Turning to the south, another extensive and important cotton district presents itself in the Southern Mahratta country, which, in spite of difficulties not likely to be overcome by ordinary means, is nevertheless enabled to send into the Bombay market certain supplies of cotton; and the same applies to almost every other remaining district that exports it. And so we deduce the argument. Leaving out of sight any question connected with internal administration, with assessment, with land tenure, or with anything else, we must come to the conclusion that hitherto it has either paid India to send us cotton, or that she has exported at a loss; but, as we find our supplies from thence, instead of diminishing, increasing, in the past 18 years, from seventy-seven millions to nearly three times that amount, we must conclude that it does pay her to do so. The facts already brought forward, as well as those about to be deduced, lead to the irresistible conclusion that India is most in want of better communication. But, before touching further on this point, I would say a few words with regard to the important question of cost of production. And here I cannot do better than adopt Dr. Royle's statement on this point, one not arrived at by any partial glance, serving only to suit one side of a question, but from searching inquiry amongst the extensive sources of information at his disposal. His conclusions are drawn from a consideration of all the elements which enter into the calculation: such as rent paid for land; cost of implements and of seed; expenses of ploughing, weeding, gathering, and preparing the wool for the market; and his conclusion is, that not merely viewing the country as a whole, but likewise having particular regard to those districts which may be looked upon as peculiarly suitable to the extended growth of cotton, the Ryot is able to sell it at a price varying from 1d. to 1½d. per lb., 1¼d. being a common price. It is true that there are some districts in which the price mounts to 2d. per lb, for instance in the Rohilcund division; and this, too, notwithstanding the fact that the yield per acre is double that of the cotton exporting districts. The reason of this is worth attention. Though the Government demand for revenue amounts only to 3s. 10½d. per acre on the entire cultivation, the Zemindar underlets what he considers good cotton lands to the Ryots for not less than 8s. per acre.

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* Some observations by Dr. Riddell on this point lead to a different conclusion.

So far, then, with regard to the cost of production: turn now to an allied subject. There are many here to whom it will be no new information to be told that, although, as seen in Table II., columns A and B, (p. 286,) Britain is chiefly supplied with cotton from America and India, still, from the hitherto over-powering productiveness, combined with transit facilities of the former, the element of competition has not had full play. Up to the present the supply from India has been entirely influenced and over-awed by that from America. Omitting years like 1835, when New Orleans cotton was selling at 10¼d., and Surats (or East India) at 7½d., and coming down to these later days, when, as will be seen from columns E and F in Table II., that American cotton was selling at Liverpool nearly as low as 4d., and Surats at 3d., and we shall see reason to conclude that the development of the power of India to compete with America is in one respect a question of price. Of the superior quality of the American cotton there can be no doubt, and a glance shows that every pound of New Orleans cotton fetches upwards of 1d. more. There is, indeed, every reason to believe—nay, there is absolute certainty of the fact—that, eventually, Indian native cotton will be sent into the market both cleaner and of greater value; and also that cotton grown from American seed will, in time, be produced of a quality of the same average goodness. But I would deal with the question not merely as a thing of possibility but of fact. A further inspection of Table II. affords abundant evidence of the present sensitiveness of the Indian export trade, and the manner in which it has hitherto been controlled. It appears that, under present circumstances, it would be impossible, with any profit, to import Indian cotton into Liverpool under 3½d. per lb., but as we find that American invariably brings from 1¼d. to 1½d. more than East Indian, it becomes of interest to inquire how often, during the last eighteen years, the India merchant has been compelled to sell below a remunerative price? This has occurred five times since 1840. The two points connected with the subject of increased supply are brought into clear relief by these tables. During the year 1845 one of the largest crops which had, up to that period, been grown in America was produced, and, consequently, such a considerably larger quantity was introduced into the Liverpool market, that the price fell to a point which obliged the holder of Indian cotton to sell at 3d. per lb. The result was, that in the following year the export from India fell to nearly one-half of what it was in the preceding year. As an opposite illustration, let us take an increased supply owing to better prices. In 1855, the price of cotton rose from 3½d. to 3⅞d. per lb., and the exports in the following years increased by 35,000,000 lbs. In 1856, however, in consequence of the price of American cotton having risen from 5¾d. to 6d. per lb., Indian cotton fetched 4⅜d., *and the year after we received the maximum quantity yet imported from India*, viz., 250,000,000 lbs. This latter quantity, however, as matters at present stand, must not be considered as entirely the result of increased production, for, although the price had risen to 5⅜d., the quantity obtained from India the following year only reached 138,000,000 lbs.

Again, looking to the present state of the labour-market in America, and to the evidence we possess, that the maximum of effort has probably been exerted to meet enhanced prices, and that, as a result, the production of the raw material for the average of the last four years has risen to a higher level than had hitherto been attained, notwithstanding *the price is fairly sustained*, we conclude that demand is in excess of supply, and that, as far as India is concerned, she may in future cultivate cotton without any fear of loss. And this view receives confirmation from the fact that the cost of production in America is not less than 3d., and probably 3¼d. per pound; and we have it on the best authority that in 1845 and 1848, when the average price of upland cotton in Liverpool was 4⅜d. to 4¼d. respectively, the planters throughout the southern states declared that they were working their estates for the most part at a loss.

While, therefore, we recognise the importance of the efforts which are being made by the Cotton Supply Association to encourage the growth of cotton in all parts of the world, and hail with satisfaction the success which is attending Mr. Clegg's efforts in Africa; still, for many years, whatever may be the result in other quarters, we must look to India, and India alone, for a continuous supply of what we require. And although in view of the facts admirably worked out in Table III.,* (p. 287,) for which we are indebted to Mr. Bazley, showing the value of cotton goods per head consumed by all the inhabitants of the principal countries in the world—looking to the small amounts taken by many of these, the paltry sums per head by India and Africa, and the certainty that, with ordinary freedom of access, machine-made fabrics will, in point of price, ever beat those of the hand: considering, too, that in consequence of increased demand to supply the teeming millions in China and elsewhere, it may not happen that the price of raw cotton will ever fall so low as to send slavery below the paying point; still, if this is to be brought about by cheaper cotton, India is, I believe, capable of producing that effect.

But let us finally consider the question of the prospective development of the production of cotton in India. What warrant is there for using the hopeful language I have employed?

I hold it proved that India possesses a latent power to supply cotton to any amount; and I assert that a fair consideration of circumstances now existing, or capable of being brought into active play, leads to the conclusion that we shall not look to her in vain.

I have shown that there is every reason to believe that in future, as far as America and other cotton-producing countries of the world are concerned, there is no prospect of production being carried to such an extent as to reduce the value of Indian cotton below the paying point. We have already ascertained the influence of price, and we conclude that this inducement on the part of India to grow cotton will be a lasting one, as it can be grown at a rate varying from $1\frac{1}{4}$d. to $1\frac{1}{2}$d. per lb. Our evidence leads to the deduction that further facilities of transit will so diminish the rate at which India cotton

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* Reprinted from Ellison's Handbook of the Cotton Trade.

TABLE II.

Table showing the Quantity of Raw Cotton Imported into the United Kingdom since 1840, the Price per lb. of American "Uplands" and East India "Surat" Cotton, in the Liverpool Market, the Quantity of Yarn and Manufactured Cottons Exported from Great Britain to India; of Raw and Manufactured Cotton Exported from India to Great Britain, China, and elsewhere; and lastly the Value of Cotton Manufactures Exported from Great Britain to India, and of Raw Cotton and Piece Goods Imported into Great Britain from India, for the same period.

Years.	RAW COTTON.						EXPORTS FROM GREAT BRITAIN TO INDIA.†			
	IMPORTED INTO UNITED KINGDOM FROM				PRICE.					
	U. States.	East Indies.*	Other parts.	Total.	Annual Aver.		Manufactured Cottons.		Yarn.	Total.
	lbs.	lbs.	lbs.	lbs.	Up-lands.	Surats	Yards.	lbs.	lbs.	lbs.
	A.	B.	C.	D.	E.	F.	G.	H.	I.	J.
1840	487,856,504	77,011,839	27,619,667	592,488,010	6	$4\frac{5}{8}$	145,083,799	27,203,212	16,013,708	43,216,920
1841	358,240,964	97,388,153	32,363,238	487,992,355	$6\frac{1}{4}$	$4\frac{5}{8}$	145,881,219	27,352,729	13,144,648	40,497,377
1842	414,030,779	92,972,609	24,746,698	531,750,086	$5\frac{3}{8}$	4	155,506,914	29,157,546	12,050,839	41,208,385
1843	574,738,520	65,709,729	32,744,867	673,193,116	$4\frac{5}{8}$	$3\frac{5}{8}$	215,862,174	40,474,158	16,802,958	57,277,116
1844	517,218,622	88,639,776	40,252,906	646,111,304	$4\frac{7}{8}$	$3\frac{5}{8}$	239,493,471	44,905,026	22,084,132	66,989,158
1845	626,650,412	58,437,426	36,892,115	721,979,953	$4\frac{3}{8}$	3	229,260,682	42,986,378	16,823,846	59,810,224
1846	401,949,393	34,540,143	31,366,738	467,856,274	$4\frac{7}{8}$	$3\frac{3}{8}$	231,694,439	43,442,707	24,193,923	67,636,630
1847	364,599,291	83,934,614	26,173,710	474,707,615	$6\frac{5}{8}$	$4\frac{1}{2}$	149,414,176	28,015,158	15,688,997	43,704,155
1848	600,247,488	84,101,961	28,670,712	713,020,161	$4\frac{1}{4}$	$3\frac{1}{4}$	185,375,540	34,757,914	17,991,526	52,749,440
1849	634,504,050	70,838,515	50,126,447	755,469,012	$5\frac{1}{8}$	$3\frac{7}{8}$	269,833,885	50,593,853	21,096,702	71,690,555
1850	493,153,112	118,872,742	51,551,007	663,576,861	$7\frac{1}{4}$	$5\frac{1}{8}$	284,537,862	53,350,849	20,303,013	73,653,862
1851	596,638,962	122,626,976	38,113,811	757,379,749	$5\frac{3}{4}$	4	323,930,636	60,736,994	24,400,116	85,137,110
1852	765,630,544	84,922,432	79,229,472	929,782,448	$5\frac{3}{8}$	$3\frac{3}{4}$	312,473,351	58,588,753	23,049,210	81,637,963
1853	658,451,796	181,848,160	54,978,793	895,278,749	$5\frac{5}{8}$	$3\frac{1}{2}$	321,413,627	60,265,055	23,392,329	83,657,384
1854	722,151,346	119,836,009	45,345,794	887,333,149	$5\frac{3}{8}$	$3\frac{1}{2}$	478,750,717	89,765,759	25,094,439	114,860,198
1855	681,629,424	145,179,216	64,943,312	891,751,952	$5\frac{3}{4}$	$3\frac{7}{8}$	424,631,817	79,618,466	27,447,590	107,066,056
1856	780,040,016	180,496.624	63,349,888	1,023,886,304	6	$4\frac{3}{8}$	423,304,389	79,369,573	23,085,680	102,455,253
1857	654,758,048	250,338,144	64,222,704	969,318.896	$7\frac{1}{4}$	$5\frac{3}{8}$	419,266,233	78,612,419	17,846,904	96,459,323
1858	833,237,776	132,722,576	68,381,824	1,034,342,176	$6\frac{1}{4}$	$4\frac{3}{4}$	...	...	...	...

Years.	EXPORTED FROM INDIA TO										VALUE.	
	GREAT BRITAIN.		CHINA.		OTHER PARTS.		ALL PARTS.				COTTON, YARN, AND MANUFACTURES.	
	Piece Goods.	Raw Cotton.	Piece Goods.	Raw Cotton.	Piece Goods.	Raw Cotton.	Piece Goods.		Raw Cotton.	Total.	Declared value of Exports from Great Britain to India.†	Computed value of Cotton and PieceGoods Imported f'm India to Gt. Britain.
	Pieces.	lbs.	Pieces.	lbs.	Pieces.	lbs.	Pieces.	lbs.	lbs.	lbs.	£	£
	K.	L.	M.	N.	O.	P.	Q.	R.	S.	T.	U.	V.
1840	246,318	85,576,622	3,423	50,433,490	2,926 776	23,172,199	3,176,517	8,258,944	159,182,311	167,441,255	3,873,186	NO RETURNS.
1841	169,944	118,544,711	7,299	62,098,629	2,727,198	13,612,539	2,904,441	7,551,546	194,255,879	201,807,425	3,427,612	
1842	125,922	72,627,646	9,435	108,294,460	2,539,833	8,988,874	2,675,190	6,955,494	189,910,980	196,866,474	3,060,472	
1843	108,456	93,501,466	8,460	80,197,721	2,575,176	28,802,581	2,692,092	6,999,439	202,501,768	209,501,207	3,937,414	
1844	133,950	58,130,226	16,968	101,100,422	2,286,318	5,246,669	2,437,236	6,336,813	164,477,317	170,814,130	4,793,192	
1845	294,234	43,177,397	10,851	77,749,581	2,195,928	5,350,572	2,501,013	6,502,633	126,277,550	132,780,183	4,210,423	
1846	296,010	91,074,244	4,917	74,970,163	2,628,651	3,036,424	2,929,578	7,616,902	169,080,831	176,697,733	4,341,885	
1847	185,937	94,201,740	16,716	62,196,060	2,248,860	3,919,495	2,451,513	6,373,933	160,317,295	166,691,228	3,178,535	
1848	107,817	67,203,519	49,827	96,119,905	1,914,108	5,308,042	2,071,752	5,386,555	168,631,466	174,018,021	3,037,871	
1849	116,973	110,690,357	1,968	52,445,222	2,108,319	2,529,641	2,227,260	5,790,876	165,665,220	171,456,096	3,977,805	
1850	146,403	141,446,798	8,232	77,050,629	1,758,318	7,976,256	1,912,953	4,973,677	226,473,683	231,447,360	4,708,813	
1851	212,904	81,104,223	5,118	160,717,651	2,028,057	11,730,957	2,246,079	5,839,805	253,552,831	259,392,636	5,046,221	
1852	409,866	181,360,994	26,802	75,671,742	2,230,452	5,875,438	2,667,120	6,934,512	262,908,174	269,842,686	4,707,120	
1853	324.321	138,183,429	2,631	55,777,008	1,820,154	3,801.328	2,147,106	5,582,475	197,761,765	203,344,240	5,078,668	
1854	250,737	119,513,537	13,050	45,893,923	2,022,054	8,372,732	2,285,841	5,943,186	173,780,192	179,723,378	6,560,236	1,798,421
1855	110.838	170,771,510	4,677	56,691,112	2,082,192	9,717,427	2,197,707	5,714,038	237,180,049	242,894,087	5,842,974	2,327,528
1856	136,002	253,410,036	3,624	48,784,561	2,325,003	17,458,927	2,464,629	6,408,035	319,653,524	326,061,559	5,857,445	3,597,752
1857	104,949	197,221,247	88,980	20,524,119	2,122,146	42,608,686	2,316,075	6,021,795	260,354,052	266,375,847	6,083,266	5,519,669
1858	...	...	...	...	...	...	...	...	...	...	...	...

Note.—The weight of the Cotton Goods Exported to, as well as Imported from, India, from the impossibility of ascertaining the specialities of different qualities, is merely put forward as an approximate estimate; every care has, however, been taken to arrive at as fair a conclusion as possible. The determination is, in the first instance, based on calculations approximatively showing that each yard of Manufactured Cloth sent to India weighs on an average $3\frac{1}{50}$ oz.; and with respect to the Goods Imported from India that these weigh 3·09 lbs. per piece.

* Includes Ceylon, the Import of Raw Cotton from which, in 1857, was 2,036,832 lbs.

† Includes Ceylon and Singapore previous to 1848; not having been defined in Official Returns earlier than 1849.

TABLE III.*

	Population.	Total Value of Exports.	Value per head of Exports to each Country.		
		£	£	s.	d.
Russia—Northern Ports	67,000,000	180,249	0	0	0½
Southern Ditto	3,000,000	13,750	0	0	1¼
Sweden	2,864,831	54,637	0	0	4½
Norway	1,050,132	54,430	0	1	0¼
Denmark (including Iceland)	2,900,000	101,158	0	0	8¼
Prussia	15,726,820	27,245	0	0	0⅜
Mecklenburg Schwerin	20,000	60	0	0	0¾
Hanover	2,003,200	147,420	0	1	5½
Oldenburg and Knaphausen	241,000	...		...	
Hanseatic Towns.	384,000	3,064,380	7	19	7
Heligoland	2,000	2		...	
Holland	2,444,550	2,247,178	0	17	11½
Belgium	2,533,538	299,236	0	1	8¼
Channel Islands	143,126	48,292	0	0	6¾
France	36,897,152	155,710	0	0	1
Portugal Proper	4,530,000	664,363	0	3	0
Azores	271,416	49,552	0	3	7¾
Madeira	90,000	17,684	0	4	0
Spain—Continental and Balearic Islands	14,357,210	86,133	0	0	1¼
Canary Islands	200,000	65,275	0	6	6
Gibraltar	17,024	403,670	23	14	2¾
Italy, &c.—Sardinian Territories	4,890,000	306,783	0	1	3
Duchy of Tuscany	1,275,000	368,113	0	5	9¼
Papal Territories	2,500,000	159,776	0	1	3¼
Naples and Sicily	7,500,000	361,523	0	0	11½
Austrian Territories	7,835,000	341,469	0	0	10½
Malta and Goza	120,000	140,991	1	3	6
Ionian Islands	208,100	86,060	0	8	3
Kingdom of Greece	1,000,000	108,058	0	2	2
Turkish Dominions and Egypt	26,100,000	2,466,108	0	1	10½
Tunis	100,000	...		...	
Algeria	2,000,000	...		...	
Morocco, &c.	15,000,000	63,810	0	0	1
Eastern, Western, and Southern Africa, with the African Ports on the Red Sea, Cape Verde, Ascension, and St. Helena Islands	10,000,000	613,325	0	1	2¾
Mauritius	101,469	129,992	1	5	7¼
Aden	40,000	535	0	0	3
Persia	13,750,000	...		...	
Continental India, with the contiguous Islands	150,000,000	5,680,069	0	0	9
Islands of the Indian Seas—Java	5,000,000	448,265	0	1	9½
Philippine Islands	2,500,000	344,155	0	2	9
China	360,000,000	1,129,799	0	0	0¾
Hong Kong	20,000	278,634	13	18	7½
Japanese Islands	25,000	...		...	
British Settlements in Australia	2,695,000	1,040,521	0	7	8½
South Sea Islands	600,000	18,880	0	0	0¾
British North America	2,456,046	749,252	0	6	1¼
British West India Islands, and Guiana	944,800	395,026	0	8	4¼
Honduras (British Settlements)	14,600	56,865	3	17	10½
Foreign West Indies—Cuba	600,000	384,464	0	12	9¾
,, Porto Rico	461,200	4,917	0	0	2½
,, Guadalope	120,839	...		...	
,, Martinique	135,000	...		...	
,, Curacoa	31,000	11,978	0	7	8¾
,, St. Croix	...	...		...	
,, St. Thomas	8,000	295,708	36	19	3¼
French Guiana	...	...		...	
Dutch ditto	236,000	1,031	0	0	1
Hayti	860,000	76,474	0	1	9¼
United States of America	27,000,000	4,182,901	0	3	1
California, Mexico, and Central America	8,000,000	754,547	0	1	10½
New Granada	28,000	293,731	10	9	9½
Venezula	1,267,962	158,923	0	2	6
Ecuador	500,000	19,569	0	0	9¼
Brazil	6,000,000	1,788,366	0	5	11½
Oriental Republic of the Uruguay	860,000	264,442	0	6	1¾
Buenos Ayres	100,000	255,508	2	11	1¾
Chili	1,600,000	593,085	0	7	4¾
Bolivia	1,500,000	...		...	
Peru	2,000,000	658,315	0	6	6¾
Falkland Islands	12,000	200	0	0	4
Greenland, and Davis' Straits	20,000	...		...	
Total	825,690,745	32,712,002			
Estimated Consumption of Cotton Manufactures in Great Britain and Ireland	27,512,687	21,224,494	0	15	5
Totals for the World	853,203,432	53,937,396	0	1	3⅛

* Reprinted from Ellison's Handbook of the Cotton Trade.

can be sent into the market—so increase the present margin—as to make its cultivation a favourite, because remunerative.

On referring once more to Table I., in the first-mentioned places we find that where nature has provided the people with favourable means of exit, they have doubled their exports to meet our demands; in others, from want of these, with similar inducement during the same period, and with means for vastly extended cultivation, we find scarcely any increase; for with the present means of communication, it has been found impossible to do more than send down to the coast a few thousand bales instead of the hundreds of thousands required. With these facts in view, I hold it to be impossible to exaggerate the benefits likely to be derived from the improved means of transit which are either in prospect or in course of realization. Both the necessities of India, as well as the wants of this country, demand the speediest accomplishment of this, and require that no efforts shall be spared to conclude, as rapidly as possible, the works already commenced.

I admit the importance of all that is said with respect to the advantages arising from the double functions—cheap transit and irrigation—capable of being performed by canals; and I have endeavoured to show that by means of the latter only can we hope from many districts to obtain a supply of cotton. Our necessities are urgent. We have shown that extensive inland districts produce now an article fairly suited to our wants. Some of these, at least, can never be reached by either canals or rivers rendered navigable: by railways alone can this be effected. Take a practical view of the matter. We want cotton from Berar, and the Great India Peninsular Railway sends a branch through almost the heart of the country to Nagpore. Candeish will be so far affected by the same line and the Bombay, Baroda, and Central Indian Railway will, when completed, render the conveyance of the produce of Guzerat independent of the monsoon. Extending through a portion of the Deccan, we find the southern branch of the Great Indian Peninsular joining with the Madras railway, and giving exit means to the cotton of Bellary, and the produce likely to be developed along the course to the north.

In the south of the Peninsula, we find the Great Southern of India and the Madras line preparing to sweep in their course cotton districts which we have shown capable of supplying one-fourth of our present wants.

To Dharwar no line has at present been sanctioned, but to obtain cotton from thence the railway is essential. In the north-west, that portion of the East Indian not in connection with the navigable portions of the river, will greatly assist in removing the produce of the Gangetic Doab. The same end will likewise be accomplished by the Punjaub railway in the north, and by that of Sind in the south.

Practically, the railways first mentioned are those to which we must look for immediate help. Table IV., (p. 288,) gives us a condensed view of all essential particulars in connection with the different Indian railways, showing the length of line now sanctioned, the amount open, and that in course of execution. Thus, of the 4847 miles sanctioned, only 559 miles are opened, but 3038 are in course of execution; and we may rest assured that from the rapidly accumulating evidence of their importance, the utmost vigour will be exercised in their completion. It has been said, that, compared with the necessities of the country, the four or five thousand miles of railway now sanctioned will prove a mere drop in the cup of India's necessities, and that her wants are variously estimated at, from 20 to 30,000 miles of road. If we consider, however, in connection with our cotton wants, the difficulties which the lines alluded to are certain of overcoming, we must conclude that with a line to Dharwar these will prove sufficient, always sup-

TABLE IV.

INDIAN RAILWAYS.

Name of Company.	Direction of Line.	Length of Line Sanctioned	Length of Line Open.	Length in course of Execution.	Date when it is expected further portion of the line may be opened.	CAPITAL. Estimated Amount.	Amount Sanctioned.	Amount Paid up.¶
		Miles	Miles.	Miles.		£	£	£
East Indian	Calcutta to Delhi*..... Allahabad to Jubbulpore	1.100 300 Total 1,400	Calcutta to the river Adjai, and Branch to Raneegunge......... 143 Allahabad to Cawnpore... .. 126 Total 269	831 The works on the Jubbulpore Branch are just about to be commenced.	To Rajmahal by the end of 1860. To Allahabad end of 1861. To Delhi and to Jubbulpore end of 1862. (*This is exclusive of the large Bridges*).	12,731,000	12,731,000	9,611,905
Madras	Madras to the Western Coast at Beypore, with a Branch to the Neilgherries. Bangalore Branch...... Madras to Bellary......	430 80 310 Total 820	Madras to Goreatum... 96	334 Operations on the Main Line to Bellary and on the Branch to Bangalore will commence shortly.	To Beypore by end of 1859. (*Other Lines not estimated*).	6,000,000	4,000,000	3,181,200
Great Indian Peninsula...............	Bombay to Callian, with Branch to Mahim.................... Callian to Jubbulpore Callian, *via* Poonah, to the river Kristna Branch from Bhosawal to Nagpore ...	35 572 366 263 Total 1,236	Bombay to Wassind on the N.E. line, and S. E. to Campoolie—also from Lanowlie to Decksal. Total 194	1,042	To Sholapore, Sept., 1859. To Jubbulpore and Nagpore, 1862. Works on Bhore and Thul Ghauts, 1861.	10,000,000	8,333,300†	3,907,870
Sind: Sind Railway.	Kurrachee to Kotree on the Indus...	120	...	120	By the end of 1859.	1,000,000	1,000,000	708,057
Punjab Railway..	Moultan to Lahore and Umritser...... Delhi to Lahore......	230 260 Total 490	...	230	Lahore to Umritser, 1860, and to Moultan, 1862.	2,000,000‡	1,500,000	459,327
Indus Flotilla ...	For the Navigation of the Indus, &c., between Kotree and Moultan, in connection with the Railways	...	...	Boats are in course of being Built. One has been completed.	Expected to be in complete working order by end of 1859.	250,000	250,000	78,620
Bombay, Baroda, & Central India....	Bombay, by Surat & Baroda, to Ahmedabad...	322	...	322	Surat to Ahmedabad, June, 1859. Bombay to Surat, 1861.	2,500,000	1,750,000	841,531
Eastern Bengal	Calcutta to Dacca,§ with a Branch to Jessore	130	...	130	End of 1861.	1,000,000	1,000,000	336,227
Calcutta and South Eastern	Calcutta to the Mutlah	29	...	29	End of 1860.	250,000	250,000	57,000
Great Southern of India	Negapatam to Trichinopoly, ‖ with Branches to Salem and to Tuticorin ...	300 Total 4,847	...	Surveys of this Line are now being made.	Negapatam to Trichinopoly, 1860.	2,000,000	For the line from Negapatam to Trichinopoly, 500,000	40,000

SUMMARY.

		Miles.
Length of Railway sanctioned		4,847
Length of Railway open...		559
Length of Railway in course of execution		3,038
** Length of Railway expected to be open	in 1859	747
Ditto	in 1860	279
Ditto	in 1861	2,076
Estimated amount of capital		£39,731,000
Amount paid up (January, 1859)..		19,221,737

LIABILITY ON ACCOUNT OF INTEREST.

At 4½ per cent. on	£500,000 (Capital)	£22,500	0	per ann.
At 4½ ,,	333,300 (Debentures) ...	14,998	10	,,
At 4¾ ,,	1,000,000 (Capital)	47,500	0	,,
At 5 ,,	37,897,700 (Capital)	1,894,885	0	,,
	Total..........	£1,979,883	10	,,

RAILWAY DEPARTMENT, INDIA OFFICE, January, 1859.

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* Including Raneegunge and Benares Branches.

† Including £333,300 Debentures.

‡ From the Line from Moultan to Umrister. No estimate has yet been made of the Line from Delhi to Lahore.

§ The Line is only sanctioned to the Ganges at present, but it is intended eventually to be carried to Dacca.

‖ The Line from Negapatam to Trichinopoly is all that has been sanctioned for immediate construction.

¶ In England to 31st December, 1858, and in India to the latest advices.

** This does not include those lines of the dates for opening which no estimate has yet been made.

posing that we do not forget to improve or create those less substantial internal means of communication, without which the general benefits to be effected by railways would be greatly crippled. And this leads me further to inquire whether we have selected the kind of railroad most suited to India's urgent wants? It has been stated, and many arguments have been brought forward to prove it, that these high-speed railways may suit the few first-class travellers, but are not fitted to develop the immediate wants of India. Looking to the kind of railway which has been adopted to form the main arteries of that great country, viewing these in relation to the vicissitudes of the climate, and the nature of the soil—the rain which converts the often stoneless ground into a pulpy tenacious mass, which makes torrents of the smallest rivulets, and in an hour's time lays square miles of valley under water; or regarding the internal necessities for communications by roads, by tramways, and paths of all sorts which will, in time, be made in conjunction with the main; and we must conclude, that that was a wise foresight which commenced with "permanent ways." High speed is but a concomitant of durability; and if we may be permitted to take warning, as well as example, from that so-called "model country" of the West, inquiry will show the mistake occasionally committed of making low speed and cheap communications in places where the main artery should have been, as nature makes it, strong and durable.

So far I have shortly indicated our present prospects of improved communications from railways, and while attaching vast importance to these, it must not be forgotten that hundreds of miles of our great rivers are likely soon to be rendered practically available for carriage purposes by the boats now in progress, and which will doubtless before long, in point of numbers, swell into flotillas. Again, vast works of irrigation have either been completed, or are likely to receive the extended attention and encouragement they deserve.

I trust I have now said enough to fully warrant the belief that, even supposing the measures now in progress were only to be carried out, incalculable advantages are certain to accrue both to India and to Britain. I have endeavoured to show that hitherto the supply of cotton from India has apparently been only limited by the transit difficulties of the country, for in the face of these we have seen it for years struggling to supply us from her abundance in the interior, and, in spite of all drawbacks, receiving some remuneration for her exertions.

With however the means of transit now in prospect, or capable of speedy realization—with railways and other projected sources of communication—giving scope to the law of production—affording wide-spread encouragement to industry—bringing the power of self-interest to bear directly on the cultivator—leading to his removal from the heartless grasp of the usurer, or of the "middleman"—in return for the fruits of the soil, placing at his disposal cheap and suitable products from the looms of the west—in better food, better clothes, and a more comfortable dwelling, letting him taste some of the sweets that labour ought to bring—and we feel justified in the conclusion we draw, that the day is not so distant, as some would think, when India will send us in abundance, not only cotton, but every product of the vegetable kingdom required either in manufacture or in art; and be considered, not in sentiment, but in reality, the brightest jewel—the real Koh-i-noor—of the British Crown![*]

DISCUSSION.

The **Chairman** had listened with peculiar interest and pleasure to the admirable paper with which Dr. Watson had favoured them. About two years ago he (the Chairman) had the honour to read a paper before this Society, upon the question, "How are we to obtain increased supplies of cotton?" and he then pointed to India as the only country where cotton could be had in such quantities as our manufacturers required. He was happy to find that the views which he took upon that question were confirmed by so high an authority as Dr. Forbes Watson, who occupied the post which his esteemed friend the late Dr. Forbes Royle had so ably filled. Dr. Watson had told them that India produced at the present time 2,400,000,000lbs. of cotton annually—more than double the quantity produced by the whole of the United States of America. He had told them that Berar—the dark-coloured spot upon the map—produced the largest quantity and the finest quality of cotton; but, owing to the great distance from the coast, the cost of its conveyance by means of bullocks amounted to about three halfpence per lb. This was, no doubt, the great obstacle to the importation of cotton into this country from India. In America the cotton was brought down the Mississippi river, a distance of 1,000 miles, at a cost of one-eighth of a penny per lb. He had lately seen a gentleman who had surveyed the Godavery river, which joined the Wurda, and led to the district of Berar. That gentleman had informed him that this river might be made navigable at a small expense, and he had no doubt, if this could be effected, that cotton would be brought from those districts, the carriage from which cost now three-halfpence per lb., at one-tenth of that price. That was one of the most important facts that he had heard relative to the imports of cotton from India. They would see that if cotton could be brought to the ports of shipment at a penny per lb. less than at the present time, this would enable the purchaser to give a penny a pound more to the grower; and there could be no question that if three-halfpence per lb. was a remunerative price, two-pence per lb. would induce a great increase in the growth of the article. He entirely concurred in the view that Dr. Watson had taken—that the future of India was a bright one—if that country were governed with wisdom and justice, and if the means of internal communication were opened, the riches of India would cease to be fabulous, but, in the language of Dr. Watson, it would prove "the brightest jewel—the real Koh-i-noor—of the British Crown."

Mr. J. G. **Frith** remarked that the subjects brought forward in the present paper were deserving of the utmost consideration, and it must be generally agreed that no more deeply important question could be brought under the notice of Englishmen. The extent of the productions of India was comparatively unknown at the present day. He believed the statement of Dr. Watson as to the price of cotton on the spot was quite correct, but, unfortunately, that price did not go into the hands of the poor ryot, but a large portion of it was taken by the middleman, through whose hands it passed before it arrived at the port of shipment. The expense of conveyance was very great; from Berar to Bombay the cost was fourpence per ton per mile, but that varied according to the season. In the meantime, owing to the long time occupied in the transit, the article was subject to great deterioration, and it generally arrived in a very filthy state at Bombay. When the system of railway communication in India was perfected, which he hoped would be the case in a few years, he believed the cotton would be brought from Berar to Bombay at an immensely reduced rate, and the conveyance would probably be effected in less than forty-eight hours. The interior trade in cotton needed great improvement, and he thought when the means of transit were more perfect, and persons went armed with rupees, and dealt with the ryots themselves, the quality of the cotton would be improved, and more confidence given to the grower. With regard to the question of the relative suitability of railways and canals for India, he believed the resources of that country were so great that there would be ample employment for both, to the advantage both of the country itself and of England;

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[*] The author would direct particular attention to Table II., which contains many points of interest which it has been impossible to touch upon within the limits of the present paper.

The Chairman remarked that Dr. Watson had referred to India as capable of producing a great variety of articles besides cotton. The manufactures of this country were increasing at such rapid rates, that the consumption of most of the raw materials had overtaken the production. There was a scarcity of hemp and flax, and of a variety of textile articles; and he would take that opportunity of suggesting to Dr. Watson, that on some future occasion he should favour them with a paper upon some of the other valuable products of India, for he was sure such a communication would be of great interest to the Society and our manufacturers.

Dr. Riddell said there could be no doubt whatever that India was capable of producing cotton to any amount; but although cotton might be grown in India at a cost of 1¼d. or 1½d. per lb., yet the poor ryot—the cultivator—would receive no benefit to himself, even if the cotton fetched 2½d. per lb. The ryot, working himself and all his family, earned not more than what was equivalent to 2s. per week. What could they expect under such a miserable system? The ryot was ground down by persons who advanced the money to enable him to grow the cotton, a certain quantity of which he was bound to supply; and if in any particular season there was a falling off in the crop, the weight was increased by dirt and other adulteration, in order that the quota of cotton might be furnished to the parties who had bargained for it even before the crop was grown. In the district of Berar there was an extent of land capable of growing any amount of cotton; but he would not have them deceive themselves by supposing that if they sent the seed of the Sea Island or Bourbon cotton it would necessarily flourish in that part of India. It was no such thing. The black soil of the country would grow very abundant crops of the indigenous cotton, but it was not suited to the finer qualities. No doubt the finer cotton might be grown where the climate and soil were adapted to it. Some descriptions of cotton required the sea air; some required more moisture; others less. Now, in the valley of Berar, there were two descriptions of cotton grown. One was planted in June, and gathered in November or December; that was the most abundant and the cheapest; but the cotton sown in the month of March, although not so abundant, was more profitable to the cultivator, owing to its being of a finer quality. So much for the indigenous cotton of India. In looking to that cotton, it would be found to be of the green seeded description, the same which he had no doubt had been originally taken to America, and he thought it would be a most valuable experiment if either the Government or some private individuals would take some of the indigenous cotton seed from India and give it a fair trial in America, and, after three or four years, report upon its growth. He had no doubt that cotton would be equal to any that was sent to this country. The cotton seed sent from America deteriorated when continuously grown in India; he was satisfied of that fact from his own experiments; nevertheless being of a longer staple, it was more valuable than the indigenous cotton. The Sea Island cotton was a description that could not be grown to the best advantage without the influence of the sea air. At the same time, no doubt it could be grown in many parts of India, and even in Berar. He had had letters recently from influential persons in India, informing him that the exotic cotton was being extensively cultivated. The seed had been sent from Calcutta and Hyderabad, but, it being late in the season before it arrived, the yield was small, although what was grown was of good quality. From what had been done by the Cotton Supply Association of Manchester, they might hope in a year or two to have most favourable reports on this subject, and such as would satisfy them whether or not exotic cotton could be grown with advantage in Berar. A few days ago he received some samples of cotton from Berar, the produce of seed from Egypt. In looking at that cotton he found it was the green seeded cotton of the uplands of America. He had sent a specimen of it to Mr. Bazley, at Manchester, whose valuation of it was 10½d. per lb. That cotton was grown in the centre of Berar. The question was—would that seed, if grown there for several years, deteriorate? His opinion was that it would; for it was well known that if seed of any description was grown continuously in the same soil, it always deteriorated. From his own knowledge of the growth of cotton, he was satisfied that the fresher the seed was the finer would be the cotton; and he recommended that wherever seed was grown in any part of India, it should be exchanged every second or third year for the seed from other parts. Another point was the necessity of preventing the seed and plants of inferior species from being mixed with those of a better kind, for where this occurred hybrids sprung up, and an inferior quality of cotton was produced; but, with a remuneration of 8s. per month, was it to be expected that the poor ryot would pay any particular attention to this matter? It must be done by men of science—men who would devote their time and energies to it, and who would make up their minds to attend strictly to their business. The cotton to which he had already called their attention as having been grown from seed sent from Egypt, was of the green seeded description, whilst the finest Bourbon and sea Island cottons were black seeded, but these were valued at from 1s. to 1s. 3d. per lb. He therefore said that what they had more particularly to attend to was the acclimatization of the plant, and the sending the seed to those spots where that particular description of cotton would grow. When seed was sent to India for the purpose of being experimented upon, they ought to consider the place to which it was to be sent. In the upper parts of Sind, the yield per acre was 136 lbs. of cotton and seed together, and of clean cotton 33 lbs. per acre, which bore the proportion of about three-fourths seed to one-fourth of clean cotton. Going to Hyderabad they found that instead of 136 lbs. of seed and cotton per acre, they had no less than 395 lbs. per acre. How was that to be accounted for? Simply from the climate; for he found that exotic cotton grown at Shikarpore, produced only 24 lbs. of cotton and seed together per acre. That was owing to the climate being unsuitable. It was not through a want of water, for the plants were abundant, but when the plant arrived at a certain stage of growth, it fell off and withered away, producing no seed. When the railways now under construction were carried out, he had no doubt that Berar alone would be able to supply the Manchester manufacturers with as much cotton as they required.

Professor George Wilson (of Edinburgh) said, having had the honour of filling the chair of a sister society to this in Scotland for the last two years, he begged to express the pleasure he felt in attending this meeting, and the sympathising look which his own Society cast towards her senior and more famous sister here. He would also express the great delight with which he had listened to so instructive a paper from his friend Dr. Watson, whose acquaintance he owed to the fact of their both being connected with Industrial Museums. He looked with great interest to these Industrial Museums, which were, in fact, becoming schools for our countrymen before going to our foreign dependencies, in which they became familiar with the various raw materials produced there, so important to the manufacturers of this country. A growing interest was manifested on this subject, and he could mention that six young Indian officers, who had experienced the horrors of Lucknow and Cawnpore, were now spending a great portion of their leisure time on furlough in studying these matters, in order to fit themselves for turning to better account the industrial resources of India upon their return to that country. He had been struck with the identity of their remarks with those of Dr. Watson and Dr. Riddell, inasmuch as it was admitted that the two great points of difficulty in India were the want of means of transit and the necessity for a larger amount of intelligence than the natives possessed, in the collection of the raw material. He was pleased to hear that there was a probability of the difficulties of transit being soon overcome. He was also gratified to find, from the numerous letters he received from Bombay, Madras, Calcutta, &c., that there were intelligent men in those parts who were seeking to interest the natives in this important subject, and he could not but rejoice that so much community of feeling existed as to what was proper to be done in this matter. He had recently received a communication from Dr. Alexander Hunter, of Madras, who, being aware that this subject was to be brought forward, had requested him to state his (Dr. Hunter's) conviction that cotton might be very largely cultivated in India, and its present quality much improved; and also to urge that persons of a higher intelligence than that of the natives should be sent out to look after the collection of the raw material. He hailed the present intercommunication of ideas upon this subject as an omen for good with regard to the cultivation of cotton in India; and he cordially joined in the hope expressed by the Chairman that on a future occasion his friend would favour them with a paper upon the other important products of that country; a subject of so much interest to the manufacturers of England.

Mr. A. C. BRICE said he had had considerable experience on the subject of cotton growing in India. He had been in the centre of India, amongst the natives, doing that which the merchants of England were charged with not having the enterprise to do, namely, buying cotton direct from the producer. The question of the production of cotton in India was not one of soil only, and of the means of transit,—there were numerous other important points bearing upon the question. Dr. Watson had stated his opinion that India produced more cotton than the whole of America; and this view, from so high an authority as Dr. Watson he (Mr. Brice) desired fully to endorse. India had not only the means of supplying herself with cotton, but had the power to export, which power was crippled, however, by the want of means of sending the cotton to the seaboard. He (Mr. Brice) had selected Dharwar as the most favourable locality in which to settle. The house which he represented had been established in India five or six years with some success, but also with considerable disappointment. It was not simply necessary that he should go there and say he was ready to buy cotton; but he had to carry his bag of rupees upon his back, and to travel hundreds of miles with no resting place except the ground. He had to weigh the cotton himself in little lots, and when he had bought it, he had no place to warehouse it. Sometimes he placed it in a temple that had been abandoned by the natives, but then he found he had no means of getting it down to the coast. The difficulties in the way of increased production of cotton in India would be understood when he told them that, from the time the seed was put into the ground, in some cases, more than two years elapsed before the cotton reached Liverpool. In the meantime the increased production in America, which stimulated the cultivation in India, had been followed by a large crop; and the natives in the interior found their large stocks of cotton almost valueless. They had no warehouses to put it in, and no labourers to clean it. The consequence was, it became deteriorated in quality, and much of it was injured to such an extent that it might have been taken for Nankin cotton, so thoroughly smoke-dried was it. The absence of labour in India was a considerable difficulty. It took 750 hard-working women to clean a ton of cotton in a day; they would therefore imagine how slow the process was. It was not simply a question of monetary arrangement, of land tenure, or of modes of transit, but there were an infinity of other elements which entered into the question why merchants had not, and must for some years to come be deterred from, carrying their operations into the interior of India. When he (Mr. Brice) had succeeded in obtaining a tolerable footing in the country, he had to establish his own line of traffic; and he managed for a short time only to send in a few hours what took the natives many days; but rains, dry winds, and sunshine soon stopped all those arrangements. The cattle could not get food; the roads were three inches deep in powder, and from a mistaken policy the government allowed a sort of plough to work upon the road, which had been made at an expenditure of thousands of pounds. For the last eighteen months or two years the traffic in that part of the country had entirely ceased, owing to the state of the roads. India was capable of producing—and, when the railway system was opened out, would produce—as much cotton as the manufacturers of England could manage to consume and pay for. But here we came to another difficulty. The exports of India were paid for about half and half, by goods and specie. Some three or four years back, when our imports from India were 27 millions, we fancied we could manage to pay India with five millions of specie. As we increased our imports in value we had in the like proportion to increase our exports of specie. In 1857, when we got to 42 millions of imports, we had to send back 22 millions of specie. Could England, therefore, afford to import more cotton from India unless some means were devised to pay for it, other than as at present, by 20 millions ot specie. The exports to India in the exceptional period to which he was referring, amounted to only about 8d., 6½d., and 4d. per head of the population in the respective presidencies. That was a proof that India did produce large quantities of manufactured goods for her own consumption. In the little island of Ceylon they imported goods to the amount of 2s. 6d. per head, and in the Mauritius the amount was still higher. This showed what India might consume, and what England might export, if the trade were properly developed. It was even now the case that our twist competed in the market with the home-spun twist of India; and some of the articles exhibited that evening were English warp and Indian weft. The cotton grown in India could not be spun and supplied to the weaver so cheaply as they could sent it to England to be spun, and send it back in the shape of twist. The power of export from India was incalculable, but our power to pay for it was limited. If we wished to obtain the means of supporting our shipping, of supporting our merchants, capitalists, and mill-owners, it must be by efforts to get our goods into the interior of India, and draw their cotton out. There was no doubt, then, that very large supplies of cotton could be obtained from India, and all doubt upon the matter was removed when he told them that the cotton now selling in Liverpool, and which was quoted in India as the highest quality, could be produced for 1¼d. per lb., and by means of railway transit could be shipped and sold at Liverpool at 3½d. per lb. at a profit. The natives were becoming aware of this. The cultivation of exotic cotton had increased from 40,000 acres to 80,000 acres in four years, and he believed at the present time the cultivation of exotic cotton extended over 150,000 acres. 20,000 bales had already been shipped, and the quantity would have been greater, but that the indigenous and exotic cotton were planted together. What was wanted was an arbitrary government in India. The present pernicious system of contracts and forestalling the markets should be abolished. Up to the present time the government had been not only an arbitrary, but a paternal one, perhaps too much so, for Europeans could hardly get a satisfactory settlement of a judicial matter. He earnestly hoped this very interesting subject would come under consideration again before long, for it was too important to be neglected.

Colonel SYKES, M.P., would bear teatimony to the accuracy of the views of Dr. Watson in general, and he begged to thank him for the elaborate paper he had communicated. The supply of cotton to this country from India was a question of price alone. Anterior to the period embraced by Dr. Watson's tables a diagram was prepared by the late Dr. Forbes Royle (which he held in his hand), in which he showed that as the price of American cotton rose in the market here, so did the price and supply of Indian cotton increase; and as the price of American cotton fell, the quantity of Indian cotton fell in a corresponding degree. Had the price been kept up at the maximum there would have been a maximum supply from India. The ascents and descents of the quantities, as shown upon that diagram, were truly marvellous. They would scarcely suppose that there had been a supply of 30 millions of lbs. this year in consequence of an increase of a halfpenny or a penny per lb., and if that continued he had no doubt the quantity would rush up to 100 millions of lbs. next year. The fact was, when cotton was at a price of 3½d. per lb., instead of coming to England it went to China, where they got a better price. Therefore, as far as the supply was concerned, there was no doubt India could furnish it, provided the price was remunerative. It was not the cultivators themselves who supplied it, but the intermediate agents. The cultivator got his three halfpence per lb., and there all advantage to him ceased. It then came into the hands of other persons, and so found its way gradually to the coast at an augmented price, through the accumulated profits of the agents through whose hands it passed. When there was a want of indigo it was thought worth while to send out Europeans to get it, and they got land in Bengal for its cultivation. These were in the "dark" days of the Company's government, when it was said that Europeans were interdicted from going into the country; but, nevertheless, those persons somehow contrived to get land. The indigo had increased in quantity consistent with the demand in this country and in Europe generally. How was that? By those who wanted it going after it. It was the same with sugar. It had increased from small beginnings to an enormous amount. It was thought worth while by some European houses to send out agents to India, to go into the villages and collect the sugar, until it was put on board by hundreds of thousands of tons. Why should not the people of Manchester do the same when they wanted cotton, as had been done in the cases of indigo and sugar? The government of India never prevented them going there.

The Chairman.—There were no roads for the traffic when they got there.

Colonel Sykes.—If the roads were sufficient to bring sugar down 1,200 miles, surely the cotton could have found its way down; and it had done so to the extent of 250 millions of lbs. in one year. There was no question that they could get the cotton, if those gentlemen who raised the outcry against the Indian government would pay a proper price for it; but the wheel stuck in the rut, and, instead of helping themselves, they called upon Hercules to assist them. With regard to the introduction of arts and manufactures into India, he could say they were introduced when our own ancestors were savages covered with blue and red clay. With regard to European capitalists getting land in India, he thought they must agree that there was no difficulty about that. He found himself in a hornet's nest when he asserted, on a former occasion, that since 1839 any European could go into India and take land upon reasonable terms. It was objected that there was no fee-simple in the land, but the tenure was for 99 years, and surely that was tolerably well for one man's lifetime. Some of his friends were very anxious upon the subject of river and canal navigation in India. There could not be a doubt that railways would be of the greatest advantage, but as regarded lines of any great length in the interior, considering the expense of European as compared with native superintendence, it would be a question whether a railway could carry bulky articles like cotton as cheaply as by water carriage; but that was a question for the future to decide. They knew that when railways were first started in this country canal property became depreciated 40 or 50 per cent., from the notion that a railway running through the district of a canal would carry off all the traffic. But experience had proved that railways could not economically carry very heavy materials over very long distances, and the canals had consequently kept up their former value, even if they had not gone beyond it. The same might occur with regard to India. He had taken a warm interest in the establishment of the first steamers on the Ganges, and although three or four parties were almost ruined by the enterprise, yet that very canal company had received in one year 100 per cent. dividend. It was to be remarked, also, that Bourne's system of train boats had been placed upon the Indus, and he had no doubt that great advantages would result from it. But with regard to the Godavery he was afraid the Chairman had not carefully studied the survey he mentioned. There was ready means of access to the Godavery, but when they got to the feeders of that river, the country was of such a nature as to involve considerable falls, which he feared there would be great difficulty in getting over. He had no doubt that engineering skill could overcome all natural difficulties, but he was afraid the expense of rendering the Godavery navigable would be a great obstacle in the way of that project.

The Chairman could inform his hon. friend that he expected evidence to be given before the Indian Colonization Committee of the House of Commons, to show that it was perfectly practicable at a small expense. He now begged to propose a vote of thanks to Dr. Forbes Watson for his very able paper. He would suggest to those who took an interest in India to consult the reports and evidence given before the Indian Colonization Committee, which was now sitting. If he were himself a young man seeking his fortune, there was no part of our colonial possessions he should so soon go to as to India; and in his opinion no part of her Majesty's dominions offered such advantages to young men in that position.

A vote of thanks was then passed to Dr. Forbes Watson.

The paper was illustrated by a large collection of cotton fabrics of Indian manufacture, with specimens of the different varieties of Indian cotton, lent from the Industrial Museum at the India House. These articles will remain at the Society's House till to-morrow (Saturday), for the inspection of members and their friends. Mr. Thomas Clegg, of Manchester, contributed a case of specimens, showing the various qualities of cotton and seed produced in different parts of the world. Mr. Charles Garnett, of Cleckheaton, and Mr. W. Jameson, of Ashton-under-Lyne, exhibited varieties of cotton gins which they have presented to the Society.

The Secretary announced that on Wednesday next, the 30th inst., a paper by Mr. S. Alfred Varley, Assoc. Inst. C.E., "On the Practical Bearing of the Theory of Electricity in Submarine Telegraphy, the Electrical Difficulties in Long Circuits, and the Conditions requisite in a Cable to insure Rapid and Certain Communication," would be read.

The following letter has been received by the Secretary since the meeting :—

Sir,—In his valuable paper, Dr. Forbes Watson has referred to the experiments in long-stapled cotton by Dr. Archibald Campbell, at Darjeeling, in Sikkim. I regret that I have received no recent information on this interesting subject, but it is very likely the whole question as to cotton in that country will be included in the returns now on their way to me for the purpose of presentation to the Committee of the House of Commons on Colonization. The success of the tea plantations has lately very much engaged the attention of the Darjeeling settlers, but the cultivation of cotton in the low grounds is not lost sight of, for I lately received a copy of a dispatch in which Dr. Campbell, the superintendent, has directed specimens of American upland cotton to be transmitted for experiment.

This brings me to another topic, which has received frequent illustrations in Dr. Watson's paper—the difficulty of communication, for the specimens of cotton seed will be weeks traversing a distance of 340 miles, in one of the most populous countries in the world. Were they sent express they would take seven days, and cost from 1s. to 1s. 6d. per ton per mile.

The first necessity to be supplied to promote the cotton cultivation, or any other branch of industry, is the provision of railway communication, and without railway communication in many parts of India even roads cannot exist, for, as Dr. Watson states, there are whole regions without metal or roadstuff, which, however, exists abundantly in the hill regions, and can be cheaply conveyed by railway. Thus Darjeeling, for instance, would supply lime and building stone to considerable districts of the low country were there suitable transport.

The next great step for the promotion of all branches of industry is the promotion of English colonization in the hill regions of healthy and temperate climates, whence English capital and English energy can be brought to bear on all parts of the country. This great influence will soon be extensively felt, for colonization is making steady progress. The accounts I receive officially from Darjeeling correspond with those from the other districts: railway communication is advancing towards the hills; and the boon promised this session by Lord Stanley, of an upset price for waste land, and a fee-simple tenure, as in the other colonies, will give a great impulse to the extension of English settlement.

I may take this opportunity of observing that I shall be happy to give any information in my power to intending emigrants, or to obtain for them authentic advice from the spot as to the employment which can be obtained for their labour or capital.—I am, &c.,

HYDE CLARKE,
Agent for the British Settlers in the Darjeeling Country of Bengal.

42, Basinghall-street, E.C., 24th March, 1859.

SOLDER FOR ALUMINIUM.

M. Mourey has described to the Société d'Encouragement in Paris, a process which he invented for soldering aluminium. He adopts an ingenious device for this purpose. In the ordinary way to solder two metals or two pieces of the same metal, all that is necessary after having prepared the two surfaces which are to be brought together, is to cover them with solder and to heat them. This mode of proceeding does not succeed with aluminium. M. Mourey prepares each of the two surfaces with a first solder, an alloy of aluminium and zinc, and then interposes between the two surfaces thus prepared another alloy richer in aluminium. In this manner the first alloy adheres to the aluminium itself, and the second alloy to the first, and thus a perfectly solid and continuous whole is obtained.

The surfaces to be soldered are prepared by being smeared with a mixture of turpentine, balsam of copaiva, and lemon juice, then placed on hot coals, and into the parts where the soldering is to take place, the flame of a gas lamp or self-acting blowpipe is directed.

Small pieces of an alloy of 6 parts of aluminium and 94 of zinc, are brought into contact with the prepared surfaces; these melt and adhere to the surfaces, being pressed against them by small tools made of aluminium. This operation is a rapid one; it requires, like any other soldering of this kind, a certain amount of care, but not more than in the hard soldering of copper. In each case a skill and knack are necessary on the part of the workman, as well as care in adjusting the temperatures, for the melting point of aluminium and zinc are scarcely 100° apart, and there is a fear whilst melting the solder lest the article itself should melt at the same time.

When the two surfaces have been thus prepared they are brought together, and kept in contact by iron wires, pincers, &c., as in ordinary soldering; pieces of the hard solder (80 of zinc, 20 of aluminium) are then placed at the points of contact, and the heat from a lamp is then applied, and the second solder melts, runs in, and adheres to the two layers of soft solder, and thus forms a strong joint.

The articles thus prepared are sufficiently strong and homogeneous to allow of their being reworked, and the joints will bear filing.

PATENT OFFICE RULES.

The following rules, in respect of communications from abroad and provisional specifications, have recently been issued :—

I. In any application for a Patent which is stated to be a Communication, the declaration must state the name and address of the party from whom it has been received, in the following manner :—

No. 1. When declaration is made in the United Kingdom,—

"That it has been communicated to me from abroad by [here insert name and address in full]."

No. 2. In other cases,—

"That it is a communication from A.B., a person resident at [here insert address in full]."

II. All Provisional Specifications must be written on one side only of each sheet.

(Signed) FITZROY KELLY, A.G.
H. M. CAIRNS, S.G.

Home Correspondence.

INTERNATIONAL EXHIBITIONS AND TRADE-MARKS.

Sir,—The Exhibition of 1851 took Englishmen and English manufacturers by surprise, and cannot be said to have been an absolute representation of British industry. The Exhibition of 1855, in Paris, was another universal Exhibition, of which English manufacturers did not take adequate advantage, as the following quotation from the official report of the Leeds' Chamber of Commerce to the Board of Trade proves :—"The manufacturers of glass, silk, pottery, stoneware, and other considerable items of Leeds production, had no representation whatsoever, which is much to be regretted, as the opportunity may not speedily occur again of bringing so completely under public notice the varied character of the industry of the town and neighbourhood, respecting which the ordinary notion is probably confined to the knowledge of a large trade in woollen goods."

The report, by Mr. J. Evelyn Denison, on agricultural implements, &c., to the Board of Trade, opens as follows :—"It was quite time that France and England should be better known to each other, and that it should be made apparent what great benefits would accrue to both countries from an improved acquaintance and extended intercourse."

"Up to 1851," says M. Léonce de Lavergne—a French writer, of high authority, and the author of *Essai sur l'Economie Rurale de l'Angleterre, de l'Ecosse et d'Irlande*,—"in France, more, perhaps, than elsewhere, notwithstanding our close proximity, an opinion had prevailed that in England agriculture had been neglected in favour of trade and commerce."

"The tariff regulations of Sir R. Peel, not well understood in their design or in their consequences, had tended to fortify this assumption. Nothing, therefore, created more surprise than the vast collection of agricultural implements which the Exhibition of London contained, and the proof they afforded of the high development of agricultural skill and science in the United Kingdom."

It has been reserved for the Paris Exhibition of 1855 to give new force to these impressions; to carry into the heart of France, and to display before the eyes of hundreds of thousands of spectators these evidences of the skill of our machine makers, placed in immediate contrast with the works of their competitors from all quarters of the world. The approach between the two nations, which was invited by the Exhibition of 1851, has been advanced and quickened by the Exhibition of 1855.

It was reserved for the Exhibition of 1855 to show that, by the use of improved implements in the tillage of the land, the produce of grain in England, per acre, is double that of France, and the English produce is three times that of France in saleable value. "Taking all products into account, animal and vegetable, it appears that the produce of England per hectare nearly doubles that of France."

In the report of the Belfast Chamber of Commerce to the Board of Trade, on the French Exhibition of 1855, I find the following statements:—

"The linen manufactures exhibited embraced a large range of qualities and prices, and nearly every nation in Europe had a fair representation of its various fabrics."

"Wurtemburg, Saxony, and Rhenish Prussia exhibited a great variety of fabrics, from the coarsest to the finest. The low and medium goods were similar to our own, but they exhibited specimens of very fine linens, which, we fear, our manufacturers will have difficulty in equalling, being made of fine hand-spun yarn, regardless of expense, for the Russian market.

"One piece equal to a 3,800 4-4 was 15*s.* 0*d.* ℔ yd.
" " 2,800 4-4 " 6 9 "
" " 2,600 4-4 " 3 9 "
" " 2,400 4-4 " 3 4 "

"In the linens made for exportation, *they imitate the Irish marks and finish, and in many instances even the same paper ornaments used by the Irish trade.* This is an interesting phase in the history of the linen trade—that Germany, from whom we borrowed the names of a great variety of our linen fabrics, and still export them under these names, is now, in its turn, borrowing from us, and imitating our goods both in names, materials, and finish."

I am led to send the foregoing quotations, as the latter, more particularly, was recalled to my mind upon reading the report, in the *Journal*, of Professor Leone Levi's paper on "Trade-marks." The author of that paper says, "The lofty position gained by the British manufacturer in the markets of the world is, indeed, one of considerable difficulty and delicacy. Exposed to open competition both at home and abroad, it is not sufficient for him to have secured such a position by dint of industry and perseverence—he must maintain it by continued efforts towards absolute excellence."

It is evident that our manufacturers are fully alive to the importance of International Exhibitions, as affording them opportunities for displaying the degree of perfection to which they have attained, and of extending a knowledge of their power of producing classes of goods in reference to which their skill, as producers, is comparatively little known. It is also evident that exhibitions raise England in the estimation of foreign countries in departments where she had previously been supposed to be in the rear of her competitors.

In conclusion, I would suggest to the Council the practicability of making use of the forthcoming Exhibition of 1861 as a means of extending the International Copyright in Trade-marks, should Government fail to conclude treaties with foreign countries before that date; and then we shall have to record that International Exhibitions will have added one more to the many claims they already have upon our support as a manufacturing and commercial people, by tending to induce a higher moral tone among trading communities.

I am, &c., S. THOMAS.

PRODUCTS OF THE COMBUSTION OF COAL GAS.

Sir,—I perceive that three errors have occurred in the numbers given in my communication at page 274 of the *Journal*, and I shall be greatly obliged if you will allow me to correct them.

About the middle of the fourth paragraph in the first column, at page 274, it is said that 521 grains of ammonia are required to neutralize the acids formed by Mr. Thompson's proportions (1,191 grains) of sulphur in 1,000 cubic feet of gas, but the proper quantity of ammonia is 1,265 grains.

Again, in the second note, at the foot of the same column, the references should be to pages 358 and 474 of Vol. II. of the *Journal of Gas Lighting*, and the subsequent pages refer to the third volume of that journal.

Lastly, the second reference at the foot of the second column should be to page 502, and not 302 of the *Journal*. I might here also take the opportunity of saying, that in quoting Mr. Lewis Thompson's accounts of the variable proportions of sulphur in coal-gas, I ought not to have omitted a very emphatic statement of his at page 455 of the third vol. of the *Journal of Gas Lighting*, where, in his comments on a report of mine to the Corporation of London, he says, "I have all along had a strong suspicion that Dr. Letheby did not know how to determine the total amount of bi-sulphuret of carbon existing in coal-gas, and his last report demonstrates the correctness of my suspicion; he is, indeed, altogether very ignorant upon the subject of gas. Thus, the *utmost* amount of anhydrous sulphuric acid which he has ever been able to obtain has not reached higher than 212 grains from 1,000 cubic feet, whereas the *smallest* I am in the habit of procuring from the same bulk of gas is nearly 400 grains. But, if he will follow the proper course, he will discover that all his conclusions are worthless on this head." Now, as I have no doubt that a great deal of special pleading, and perhaps also of abuse, will still be used to show that I am altogether wrong in my conclusions; and as I know that the utmost is always done in such cases to distract attention from the general and the main facts, by commenting on the particular affairs of an error in numbers, &c., I am anxious to correct what would otherwise be very unimportant errors in my former communication.—I am, &c.,

HY. LETHEBY.

Laboratory, London Hospital, March 19, 1859.

TRADE MARKS.

Sir,—The history of modern times goes more and more to show that the nations of Europe, if not of other parts of the world, seem but to form one and the same family, bound together by ties of the strictest *solidarité*. We see that whatever affects the welfare, moral or physical, of one member, is likely, nay sure, to produce a more or less immediate shock in the different links of this great electrical chain of human beings. Though Montesquieu's aphorism, *Verité en deça des Pyrenées, erreur au delà*, still holds good in some respects at the present day, and although no common or universal standard of absolute morality has as yet been discovered, yet an unbiassed mind cannot fail to discover a certain hallowed ground, on which all petty feuds cease, and where a kind of *Treuga Dei* reconciles and unites minds the most apparently discordant. The exposure of wrongs committed among private individuals, or large masses of men, called nations, tends no longer to foster feelings of animosity and revenge *quand même*, but must be considered as a mere philanthropic process of laying open wounds which cannot be cured otherwise than by using freely, but skilfully, the scalpel of anatomical moralists and legislators.

That process was most ably followed in Professor Leoni Levi's late paper on trade marks, and in Sir Richard Bethell's able summing up of the same. Evils were expounded on that occasion amounting to nothing less than theft, or violation of hard-earned property, and which, as such, ought to be put down by general acclamation. It could not be otherwise but that the bearing which our relations with foreigners have on the subject should have been brought to light, and that immoral deeds perpetrated abroad should equally be branded with the reprobation cast on sins committed at home. "Iliacos intra muros peccatur et extra." Such a large share of censure was given to Prussia as would stigmatize her arms, "Suum cuique," with the expletive *rapuit*. No information, however, having been given about the actual state of things respecting trade marks in that country, it may perhaps be subservient to the noble design of promoting morality in commercial transactions by means of international treaties, to give a summary of the present Prussian legislation on that subject.

The principle followed in Prussia for the protection of trade marks is contained in the resolutions carried at the general conference of the Zollverein, held in 1838 at Dresden. That principle lays down that only such articles and trade marks shall be protected as consist of the name of the individual or firm, and address, or the manufactory of the respective tradesman or manufacturer. Accordingly, the law promulgated in Prussia, on the 4th July, 1840, brought infractions of that regulation under the criminal law (Par. 269). It moreover abolished the legal right to emblems, marks, &c. A great opposition, however, having been raised in the Western and Rhenish Provinces (where several thousand such marks are current for mere iron and steel articles), the latter provision was abrogated by the Government on the 28th May, 1842 ; and on the 18th August, 1847, a special law was promulgated for the protection of trade marks on iron and steel articles manufactured in the provinces of Westphalia and of the Rhine, the provisions of which were enlarged in some respects by an ulterior law, dated 24th April, 1854. Thus the Prussian legislation respecting trade marks may be summed up as follows:—

Trade marks for all kinds of articles are protected in the whole monarchy, provided such marks consist of the name of the individual or firm, and the address, or manufactory of the manufacturer ; protection, moreover, is extended to all figurative and emblematical marks on iron and steel articles manufactured in Westphalia and the Rhine provinces.

To resume, the question of international laws regulating the use of trade marks and of original designs, patterns, and inventions as well, is a vexed one, since, as Horace has it, "Quot capitum vivunt, totidem studiorum milia." But, at the same time, it is an important one, and next to vital, since it has such a bearing on public morality. We therefore must not wonder at seeing that question incessantly mooted in every civilized community, and giving rise to "pia desideria" without end.* As for the difficulty of solving that problem, it is well known that the question, too, of literary property, was, some years ago, considered as almost insoluble in an international point of view, and yet at the present day we find the exclusive right to such property, without distinction of origin, acknowledged by states—as Belgium, Holland, and Switzerland—whose daily bread almost was piracy of literary property, and whose present book-trade, nevertheless, is in quite as flourishing, and certainly in a sounder, state than before the conclusion of international treaties which put an end to the vile system of counterfeits. As for the extension of such a benefit, I have every reason to believe that no enlightened Government will be reluctant to enter upon negotiations for the protection of a property which partakes both of an intellectual and material character, since the conclusion of such international treaties may be made not to interfere in the slightest degree with the autonomy of each independent state. "Il est bien facile," said Frederick the Great, "de se représenter une chose comme impossible, mais si on entre en action, il y aura mille facilités auxquelles on ne s'attendait pas." Let the watchword be: "J'appelle un chat un chat, et Rollin un fripon!" Men of education will understand that all over the world.—I am, &c.,

A. TOLHAUSEN.

London, March 22, 1859.

LOCAL ASSESSMENTS BILL.

SIR,—Will you allow me space in your next number to inform the Societies interested in maintaining their present exemption from local rates, that the gentlemen who met at Fendall's Hotel to-day, have had an interview with the Home Secretary, Mr. Estcourt, M.P., and he has promised to give a favourable consideration to the amendment of which Mr. Wyld, M.P., has given notice, and the object of which is to omit from the Bill so much as repeals the Societies Exemption Act, 6 & 7 Vict., c. 36.

The Committee on the Bill will be postponed for a fortnight; it will be important to our success that, in the meantime, every Society which has not already done so, should petition for this amendment; and also that every Society should write to the Members of Parliament for its district, urging them to attend the House when the Bill goes into Committee, and support Mr. Wyld's amendment.—I am, &c.,

ARTHUR RYLAND.

March 23, 1859.

MEETINGS FOR THE ENSUING WEEK.

MON. ......London Inst., 7. Mr. John Ella, "On Chamber, Orchestral, and Ballet Music."
Actuaries, 7.
Medical, 8.
Geographical, 8½. 1. Mr. Lawrence Oliphant, "Notes of a Voyage up the Yang-tse-Keang, from Wosung to Stankow." 2. Sir John Davis, Bart., "View of the Great Valley of the Yang-tse-Keang, before and after its occupation by the Chinese Rebels." 3. Ascent of the Yang-tse-Keang, by Lieut. W. Blackney, R.N., dated Shanghai, Jan. 22, 1859. Communicated by Capt. B. Drury.
TUES. ......Royal Inst. 3. Professor Owen, "On Fossil Mammals."
Civil Engineers, 8. Discussion on Mr. Jackson's Paper, "Description of the Melbourne Gravitation Water Works," and, if time permits, M. de Brussant, "On a New System of Axle Boxes and Journals for Machinery without Oil." 2. Mr. McMaster, "On the Permanent Way of the Madras Railway."
WED. ......London Inst., 3. Mr. E. W. Brayley, "On Meteorology."
Society of Arts, 8. Mr. S. Alfred Varley, "On the Practical Bearing of the Theory of Electricity in Submarine Telegraphy, the Electrical Difficulties in Long Circuits, and the Conditions requisite in a Cable to insure Rapid and Certain Communication."
Microscopical, 8.
Chemical, 8. Anniversary.
THURS. ...Royal Inst., 3. Prof. Tyndall, "On the Gravity of Liquids."
London Inst., 7. Professor Bentley, "On Vegetable Substances used for the food of man."
Antiquaries, 8.
Royal, 8½.
FRI.........United Service Inst., 3. Capt. Tyler, "On the Rifle and the Spade, or the Future of Field Operations."
Archæological Inst., 4.
Royal Inst., Meeting, 8. Lecture 9. Mr. N. S. Maskelyne, "On the Optical Relations of the Crystal Molecule as Revealed by Polarised Light."
SAT. ......London Inst., 3. Mr. E. M. Brayley, "On Meteorology."
Royal Inst., 3. Mr. J. P. Lacaita, "On Modern Italian Literature."

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* Well says Guizot, in his Histoire de la Civilisation:—"Telle est d'ailleurs la noble nature de l'humanité qu'elle ne saurait voir un grand développement de force matérielle sans aspirer à la force morale qui doit s'y joindre et la dominer; quelque chose de subalterne demeure empreint dans le bien-être social tant qu'il n'a pas porté d'autres fruits que le bien-être même, tant qu'il n'a pas élevé l'esprit de l'homme au niveau de sa condition."

PATENT LAW AMENDMENT ACT.

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APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[*From Gazette, March* 18, 1859.]

Dated 16*th November*, 1858.

2576. W. B. Johnson and J. Shepherd, Manchester—Imp. in machinery or apparatus for adjusting the permanent way of railways.

Dated 19*th January*, 1859.

168. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in apparatus for making cigarettes. (A com.)

Dated 24*th January*, 1859.

222. H. Owen, Portswood, Southampton—Imp. in stockings.

Dated 10*th February*, 1859.

378. G. L. Stocks, Bridge-road, Poplar—Imp. in steering apparatuses.

Dated 17*th February*, 1859.

448. C. Fay, Manchester—Imp. in apparatus for working railway breaks.

Dated 24*th February*, 1859.

502. J. Holms, Glasgow—Imp. in machinery or apparatus for propelling vessels, ships, and boats.

Dated 25*th February*, 1859.

512. C. W. Siemens, John-street, Adelphi—Imp. in electric telegraphic line wires. (Partly a com.)

Dated 2*nd March*, 1859.

548. J. Valda, London—Imp. in studs and other like fastenings for dresses, belts, or other purposes.
550. R. H. Collyer, Alpha road, Middlesex—A process of preparing materials for the manufacture of paper, and a machine employed therein, which machine is applicable for crushing, grinding, bruising, and reducing various substances.
552. F. J. Jones, Aldermanbury—An imp. in buckles and clasps.
554. E. Roche, Marseille, France—Imp. in the manufacture of paper suitable for forming cigarettes and for other purposes, and also imps. in the manufacture of cigars.
556. W. E. Newton, 66, Chancery-lane—Imp. in the construction of barometers or instruments to indicate pressure. (A com.)
558. J. Kershaw, Allerton, near Bradford, Yorkshire—Imp. in means or apparatus employed in weaving.
560. H. Brown, Galashiels, Selkirk, Scotland—Imp. in machinery for cutting and finishing the surfaces of woollen and other fabrics.

Dated 3*rd March*, 1859.

562. H. Kohn, 5, North-place, Gray's-inn-road—Imp. in articles of wearing apparel called coats.
563. J. Harrison, Bermondsey, Southwark—An imp. or imps. in the construction of rotating window sashes.
564. T. Wilson, Birmingham—An imp. or imps. in breech-loading fire-arms.
565. A. W. Hale, New Britain, U.S.—A new and improved machine for cutting or mincing meat, vegetables, &c.
566. J. D. Dougall, Glasgow—Imp. in fire-arms.
567. W. Jackson, Colne, Lancashire—Imp. in shuttles for looms.
568. W. Score, 9, Osborne-terrace, Clapham-road—Imp. in the manufacture of soap.
571. T. Cook, Stowmarket, Suffolk—An apparatus for raising and lowering coffins and bodies, either for burial or disinterment.

Dated 4*th March*, 1859.

573. C. F. Dennet, Pall-mall—Imp. in bayonets.
574. M. Rider, Todmorden, Yorkshire—Imp. in, or applicable to, machines for preparing, spinning, and doubling cotton and other fibrous materials.
575. J. Cowban and E. Andrews, Burnley, Lancashire—Imp. in machinery or apparatus for spinning fibrous materials.
576. R. A. Brooman, 166, Fleet-street—An imp. in boiler stays. (A com.)
577. C. R. Mead, 176, Great Dover-street, Southwark—Imp. in water gas-meters.

Dated 5*th March*, 1859.

578. W. Bailes and J. Bailes, 434, Oxford street—An improved ship's berth for prevention of sea sickness, composed of wood and metal.
579. J. M. Dunlop, Manchester—Imp. in machinery or apparatus for cleaning fibrous materials.
580. J. Leigh, Manchester—Imp. in the purification of coal gas.
581. J. Fraser, Banff, N.B.—Imp. in ploughs.
582. F. W. Parker, Sheffield—Imp. in sewing machines.
583. E. Vigers, Paddington—Imp. in the construction of ships and other vessels.
584. W. P. Savage, Roxham, Downham Market—An improved machine for excavating, raising, and depositing soil.
585. F. Verdeil, 30, Rue St. Sulpice, Paris, and E. Michel, 4, Quai Imperial, Puteaux, Seine—Imp. in treating madder.
586. G. Leach, Leeds—Improved machinery for reeling and leashing yarn or thread.
587. F. Morton, James-street, Liverpool—An imp. in the construction of strained fences.

Dated 6*th March*, 1859.

589. H. W. Patrick, 4, Mill Hill-terrace, Acton—An imp. or imps. in an apparatus for chemical and dental laboratories, or other manufacturing or experimental uses, which he proposes calling a "paragon laboratory forge."
590. D. Proudfoot, Glasgow—Imp. in Turkey-red dyeing.
591. A. Cabany, Anzin, Nord, France—A new system of quoins (wedges) for railways.
592. W. Palmer, Long Eaton, Derbyshire—An improved railway carriage break, and coupling apparatus connected therewith.
593. F. Ayckbourn, 27, Henry-street, Vauxhall-gardens—Laminating india-rubber cloths with paper sheets.
594. W. Gossage, Widnes, Lancashire—Imp. in the treatment of certain ores of copper for the extraction of metals therefrom.
595. J. Aspinall, Great Tower-street—Imp. in evaporating in vacuo.
596. P. E. Aimont, Paris—Imp. in the construction of waggons and other carriages for railways and ordinary roads, and of apparatuses connected therewith.
597. J. Orr, 31, South Albion-street, Glasgow—Imp. in weaving ornamental fabrics.
598. J. P. Clarke, King's-street Mills, Leicester—Imp. in the manufacture of reels for the winding on cotton, linen, thread, silk, or other fibrous materials.
599. J. L. Jullion and G. Pirie, Stoneywood Works, Aberdeen—The manufacture of gelatine.

Dated 8*th March*, 1859.

601. A. Booth, senr., and A. Booth, jun., Manchester—Imp. in machinery or apparatus for making or manufacturing tags for laces.
603. G. Twigg, Birmingham—An improved fusee-igniter for the use of smokers.
605. J. N. Ryder, Bexley Heath, Kent—Imp. in preserving fruits, and in apparatus used for such purposes.
607. W. Clark, 53, Chancery lane—Imp. in submarine telegraph cables. (A com.)

INVENTION WITH COMPLETE SPECIFICATION FILED.

628. N. Washburn, Massachusetts, U.S.—A new and useful or improved machine for rolling tires for wheels.—11th March, 1859.

WEEKLY LIST OF PATENTS SEALED.

[*From Gazette, March* 18, 1859.]

March 18*th.*

2106. J. Luis.
2108. J. B. Beasley.
2110. H. W. Grylls.
2114. H. Firmin.
2119. L. de Pariente.
2124. A. M. Perkins.
2130. R. A. Brooman.
2146. H. H. Henson and W. F. Henson.
2150. G. L. Fuller.
2165. E. Thompson and W. Lazenby.
2172. G. T. Bousfield.
2210. M. Henry.
2246. E. Birchley.
2277. M. Sautter.
2298. W. E. Newton.
2553. M. L. J. Lavater.
2590. M. Caton.
2674. R. Bodmer.
3746. G. W. Bales.
2762. T. Bailey.
26. M. A. F. Mennons.
28. E. Balchin.
74. T. J. Claxton.
117. W. Wilson.
124. W. Craft and T. Wilson.
170. J. C. Reid and W. Milner.
188. J. Hick & W. Hargreaves.

[*From Gazette, March* 22, 1859.]

March 22*nd.*

2129. T. Howe.
2140. D. Grant.
4145. R. A. Brooman.
2181. A. Normand.
2197. H. G. Collins.
2205. F. Trevithick.
2221. C. Hill.
2279. H. Parker.
2387. B. Goodfellow.
2455. D. Fryer, T. Leach, C. Watt, and W. Holmes.
2995. S. S. Bateson.
127. R. Romaine.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[*From Gazette, March* 18, 1859.]

March 14*th.*

630. H. Bessemer.
657. E. S. Stott.

March 15*th.*

790. F. Grice.

March 16*th.*

659. A. V. Newton.
711. W. Ball.
736. W. Ball.

[*From Gazette, March* 22, 1859.]

March 17*th.*

633. J. Mitchell.
642. T. Bird.

March 18*th.*

640. P. A. le Comte de Fontainemoreau.
670. W. Drummond.

March 19*th.*

666. J. W. Burton and G. Pye
682. G. G. A. L. M. Schelhorn.
707. J. D. Dunnicliff and S. Bates.

LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Proprietors' Name.	Address.
4152	February 28.	Air Tight Slide Cover	William Larke and Son	17, Little Moorfields, City, E.C.
4153	March 4.	Parts of a Buckle	Oastler and Palmer	13, White's Grounds, Bermondsey.
4154	,, ,,	The Solar Hat Ventilation	Stephen William Silver & Co.	66, and 67, Cornhill, E.C., &c.
4155	,, 8.	Shirt	Dawson and Macnicol	50, Buchanan-street, Glasgow.
4156	,, 9.	Spring Balance	George Salter and Co.	West Bromwich.